10060

State of Montana

■ STATE CAPITOL RENOVATION TECHNOLOGY DESIGN DEVELOPMENT

PREPARED BY:

KC/*future planning, inc.*
Two Embarcadero Center, Suite 480
San Francisco, CA 94111
(415) 765-6575

DRAFT

March 5, 1998

AGENDA

MONTANA CABLE & INFRASTRUCTURE DESIGN

DESIGN DEVELOPMENT REVIEW MEETING

	INTRODUCTION	A & E
I.	CABLE DISTRIBUTION Narrative – Horizontal Issues Riser Diagram	KC/fp
II.	TECHNOLOGY SPACES	KC/fp
III.	TECHNOLOGY STANDARDS	KC/fp
IV.	OUTLET COUNT CHART	KC/fp
V.	OUTLINE SPECIFICATION	KC/fp
VI.	SYSTEMS DESCRIPTION	KC/fp
VII.	AV	KC/fp
VIII.	WIRELESS	KC/fp
IX.	ISSUES CHART	KC/fp
X.	SUMMARY DISCUSSION	All
XI.	NEXT STEPS April 22, Presentation	KC/fp

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CABLE DISTRIBUTION NARRATIVE

A communication-cabling infrastructure will be included as part of the Capitol renovation. Included, as part of this system will be "horizontal pathways and spaces" to run the cables form the telecommunications closets to the stations and a vertical "riser" system to distribute backbone cable to Intermediate Distribution Frames (IDFs). Implementation of this system will be coordinated with the Electrical Engineer. This will be shown in greater graphic detail as design development progresses.

The riser system will consist of two vertically stacked shafts of IDFs, two for each floor. Within these closets will be 4" sleeves to route riser cable to the IDFs. A cable tray will be installed in the basement corridor to route both riser cable to the IDFs and distribute the horizontal cable throughout the basement.

Ideally, the entire cable support system from the IDFs to individual outlet locations would consist of large cable trays installed in corridors or public areas with smaller cable supports, such as J-Hooks, to bear the cable from the cable tray to the outlet conduit stub up. However, the building will not allow us to install this type of system in many locations of the building.

The limited space and historic status of the building will influence us in using a zone conduit approach. This will entail installing large (up to 4") conduits out of the IDFs or from cable tray to certain areas where cable tray could not be installed. These conduits will run to central locations, such as hearing rooms and large offices, where they will be terminated in a large pull box. From hear smaller conduits will be run to specific outlets. This will allow easy cable installation of future cable to existing outlets.

Objectives in Designing and Installing Communications Conduit

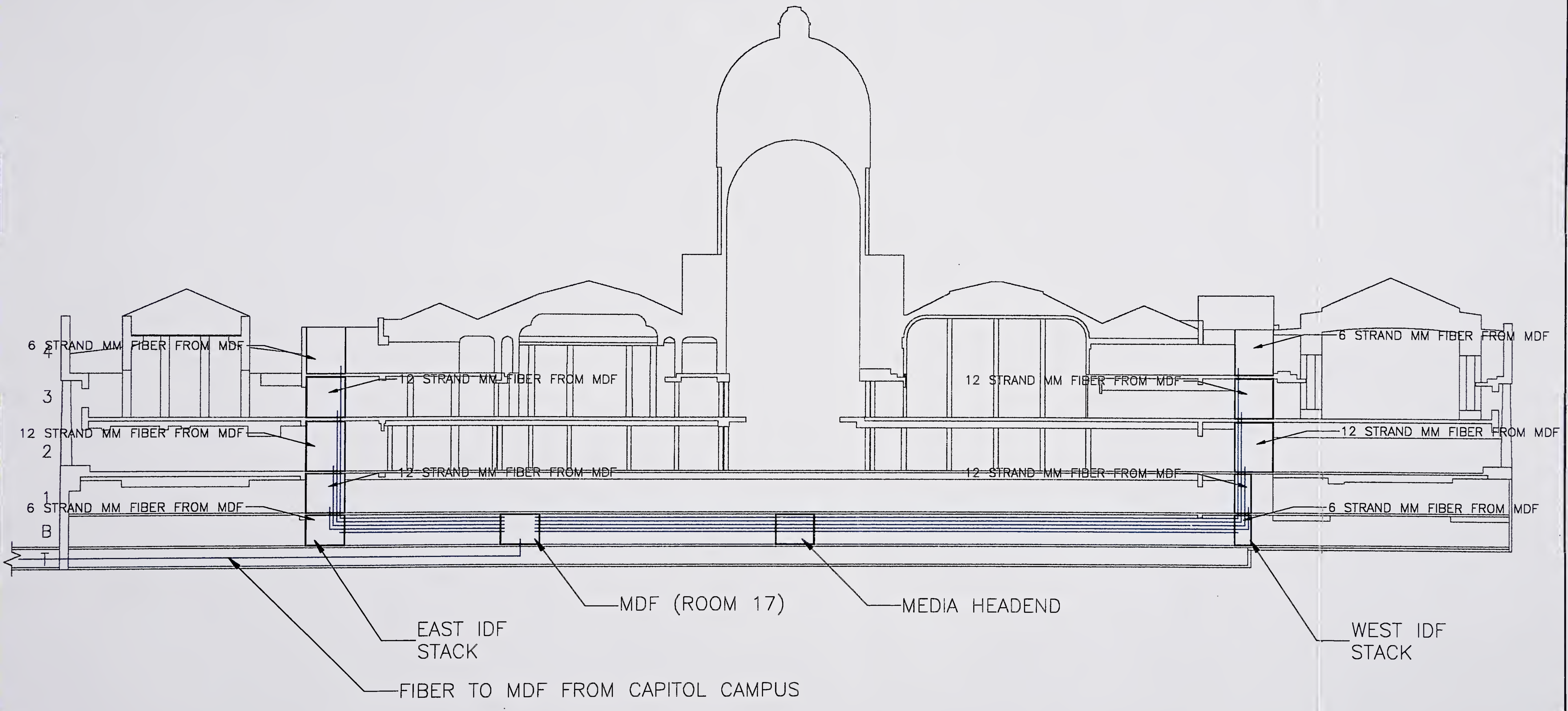
Conduit runs are to:

- Run in the most direct route possible (usually parallel to building lines), preferably with no more than two 90 degree bends between pull points or pull boxes.
- Contain no continuous sections longer than 30 m (100 ft.).
- Allow for proper conduit and cable bend radii.
- Be bonded to ground on one or both ends, in accordance with ANSI/TIA/EIA-607.
- To meet a fill capacity that will allow for full population of all outlets that will be fed from a specific conduit at a rate of 40%.
- Avoid areas over or adjacent to boilers, hot water lines and steam lines.
- Avoid adjacent and parallel paths to electrical distribution cable.
- Have reamed ends with insulated bushings to eliminate sharp edges.
- Be clean, dry, and unobstructed, capped for protection, equipped with pull strings and labeled for identification at completion of installation.

Objectives in Designing and Installing Communications Cable Tray

Cable tray runs are to:

- Be only in fully accessible areas, such as drop ceilings, with sufficient space (3 in. above ceiling and 6 above cable tray) for access and straight level paths.
- Avoid conflicts with lighting fixtures, structural supports and air ducts.
- To meet a fill capacity that will allow for full population of all outlets that will be fed at a rate of 50%.
- Provide continuous cable support from the outlet location to the IDF.



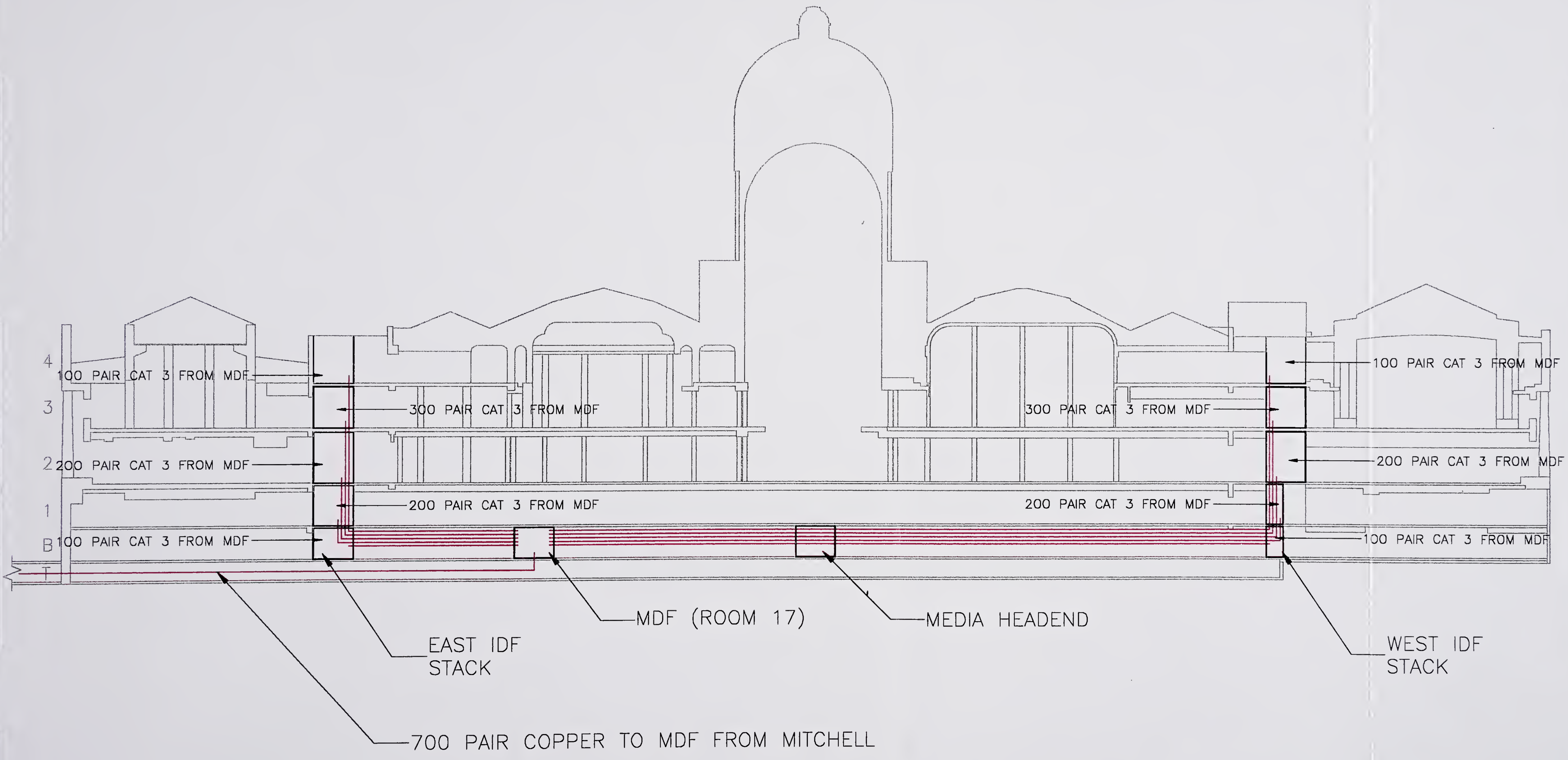
DRAFT

TITLE: RISER DIAGRAM DATA

STATE OF MONTANA CAPITOL

KC/future planning, Inc.

SCALE: N/A
DATE: 3/5/98



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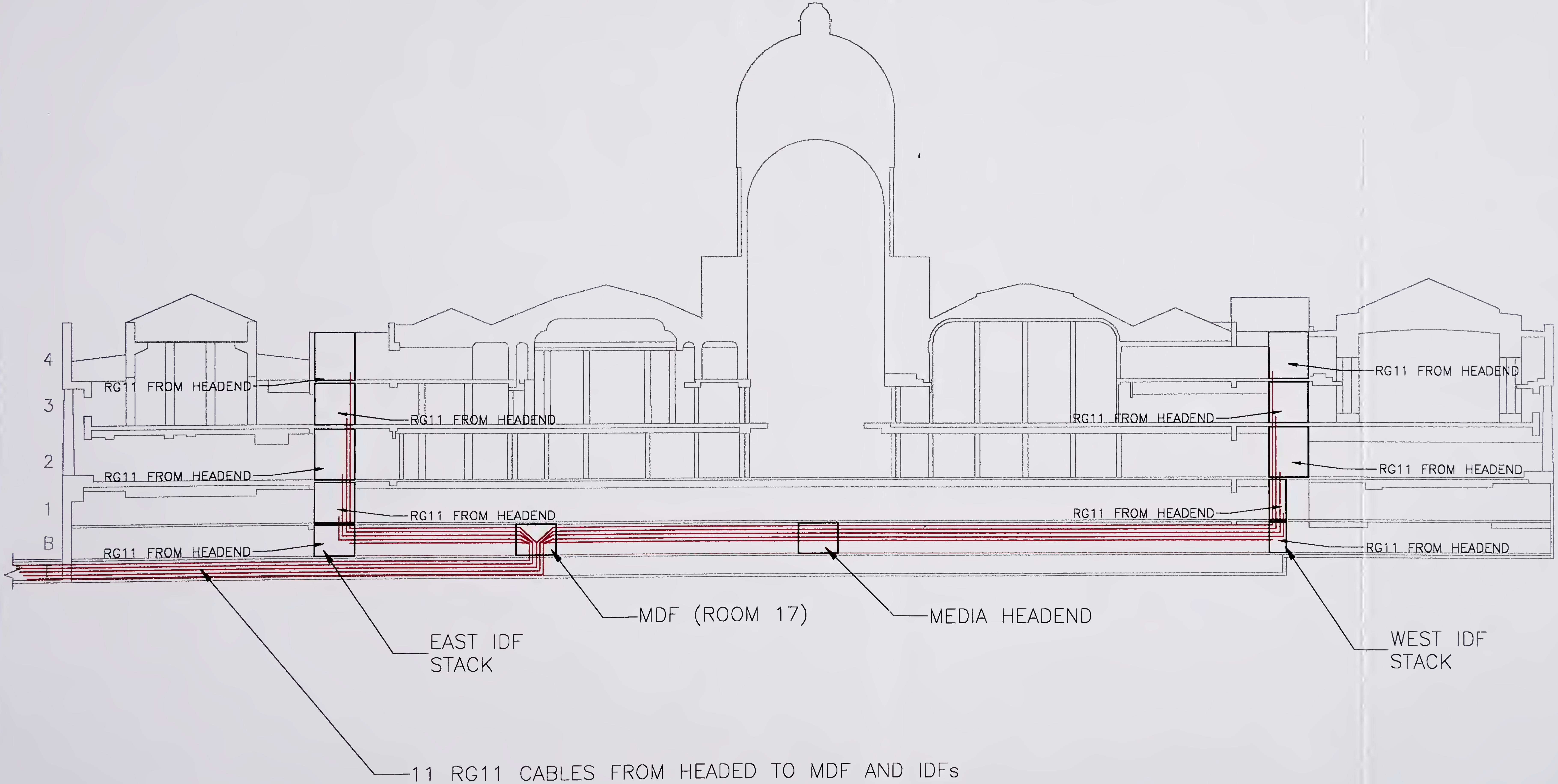
TITLE:
RISER
DIAGRAM
VOICE

STATE OF
MONTANA CAPITOL

KC/future planning, inc.

SCALE: N/A
DATE: 3/5/98



TITLE:
RISER DIAGRAM VIDEO

DRAFT

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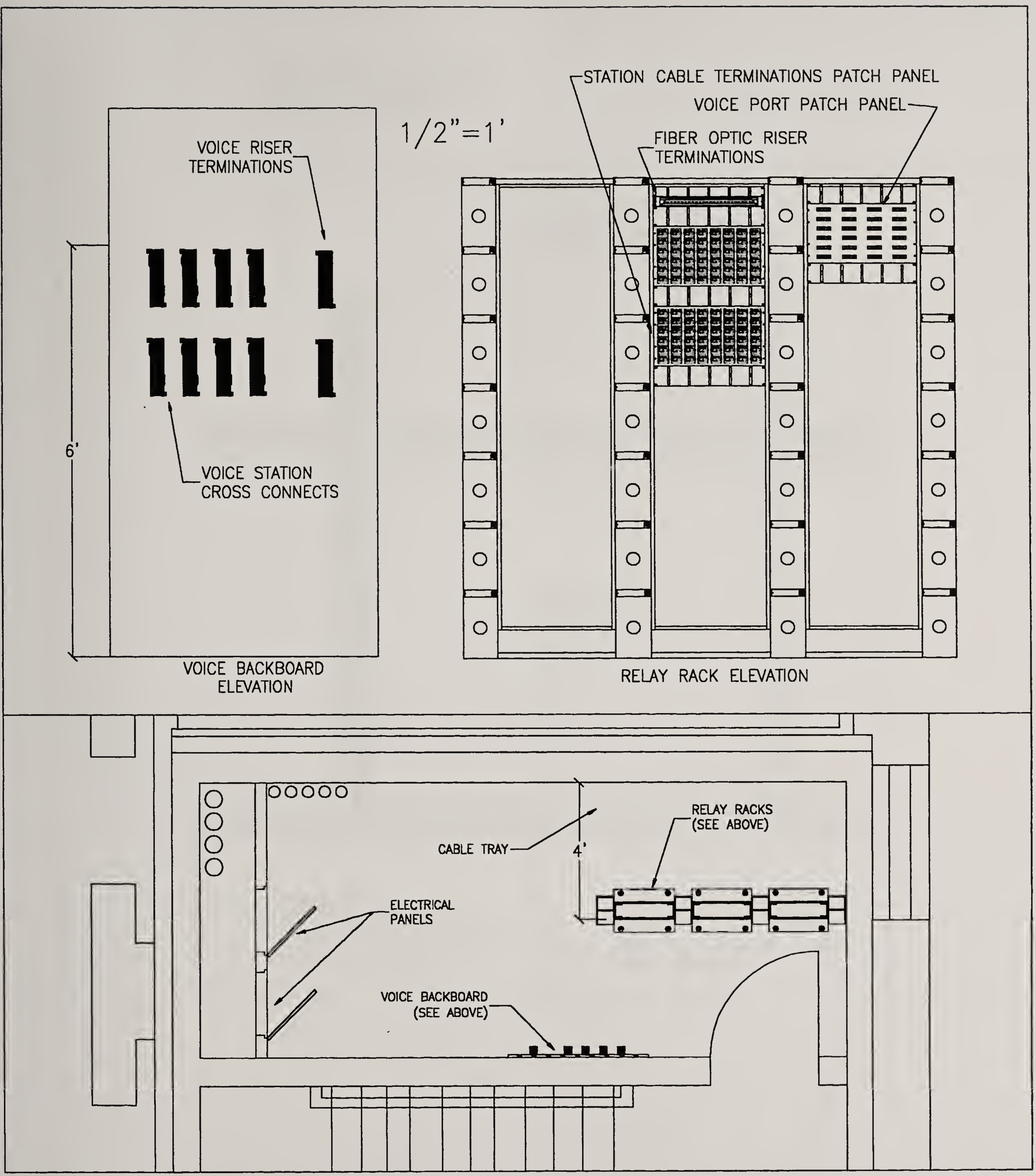
SCALE: N/A
DATE: 3/5/98



STATE OF MONTANA CAPITOL

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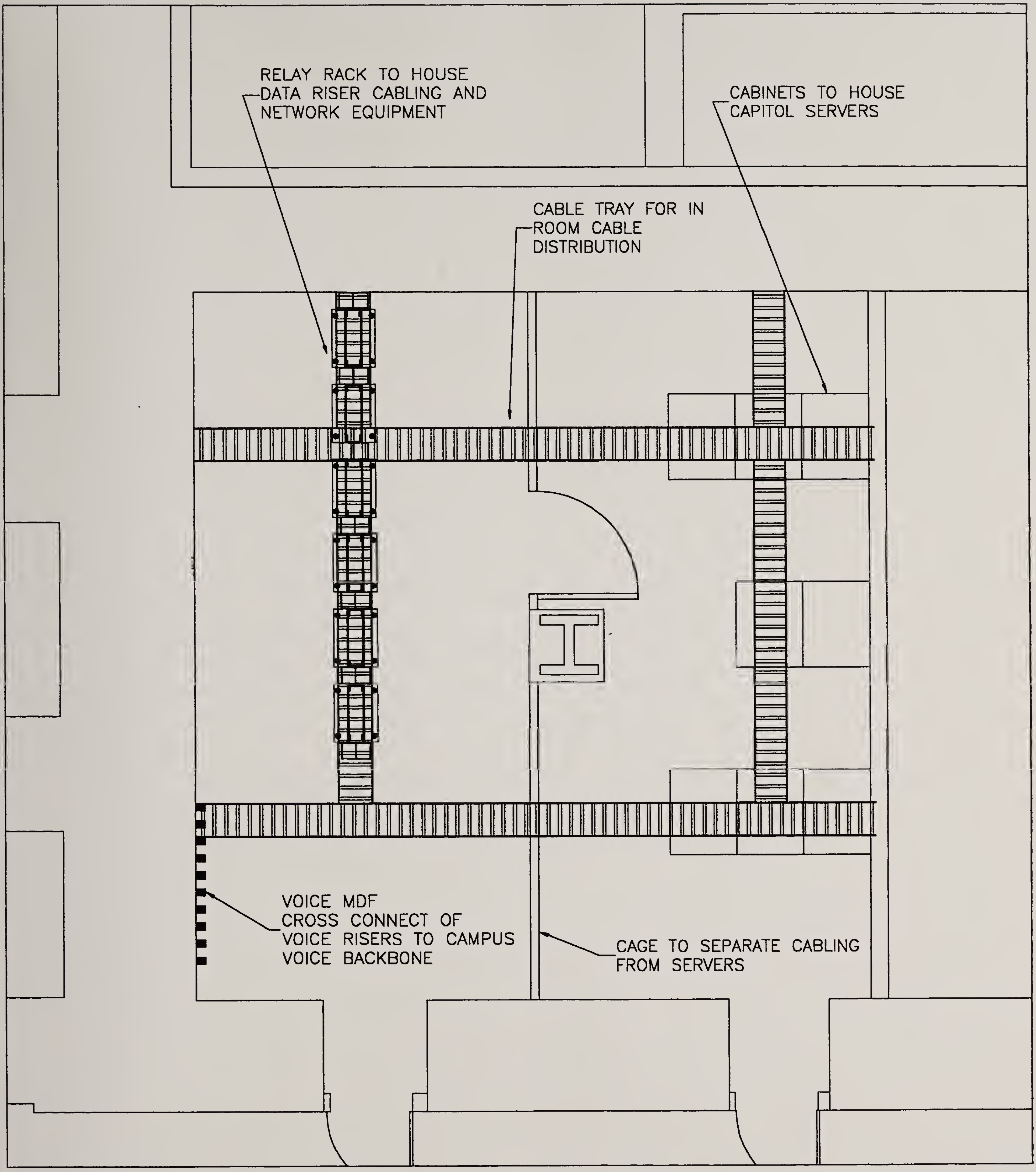
TITLE:

TYPICAL IDF LAYOUT

SCALE: 1/4"=1'

DATE: 3/5/98

KC/future planning, inc.



STATE OF MONTANA CAPITOL

DRAFT

TITLE:

MDF LAYOUT
BASEMENT
ROOM 17

SCALE: 1/4"=1'
DATE: 3/5/98

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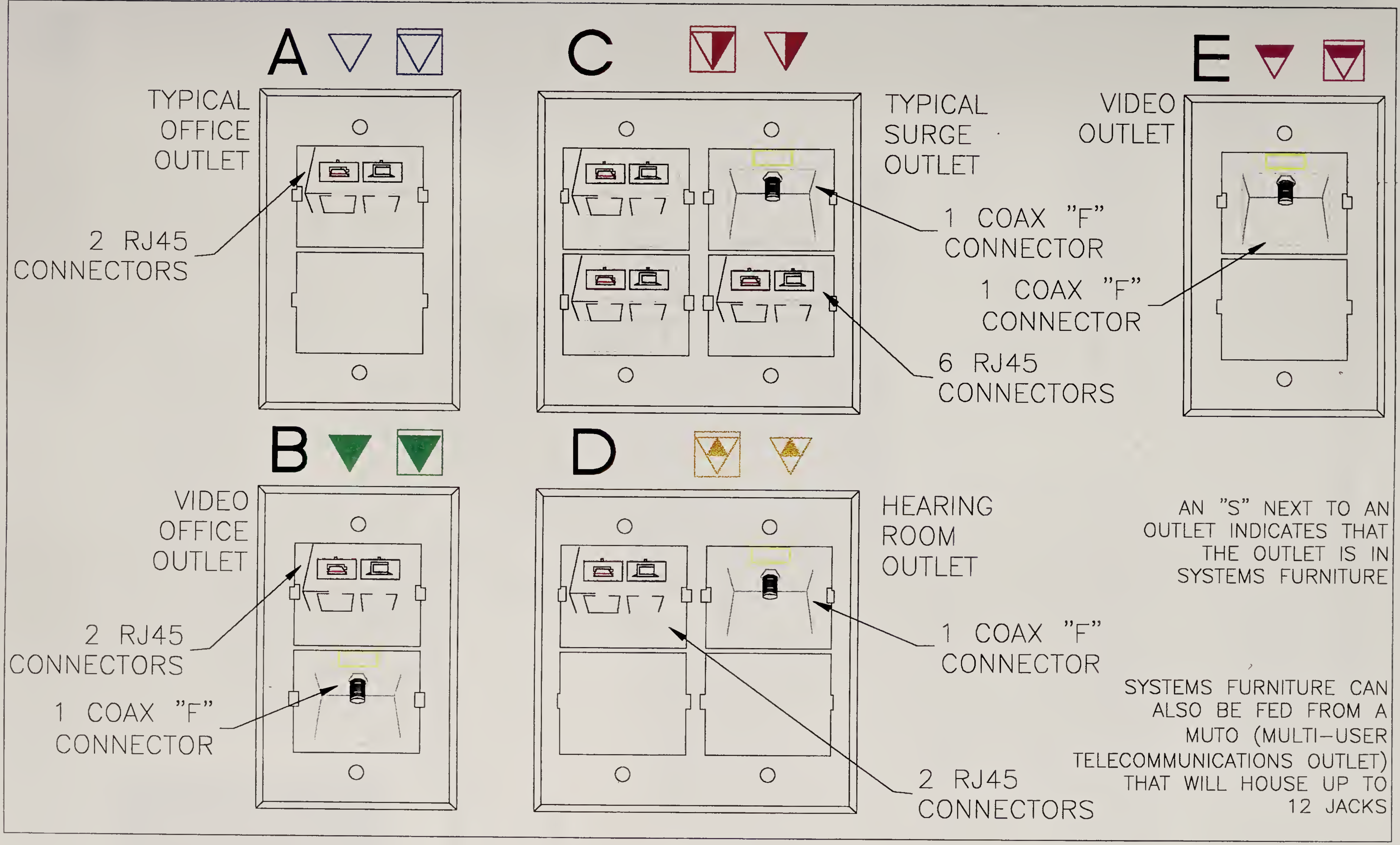

AN "S" NEXT TO AN OUTLET INDICATES THAT THE OUTLET IS IN SYSTEMS FURNITURE

SYSTEMS FURNITURE CAN ALSO BE FED FROM A MUTO (MULTI-USER TELECOMMUNICATIONS OUTLET) THAT WILL HOUSE UP TO 12 JACKS

STATE OF MONTANA CAPITOL

DRAFT

TITLE:

TYPICAL TECHNOLOGY OUTLETS

SCALE: N/A
DATE: 3/5/98

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fax 415 765-6571
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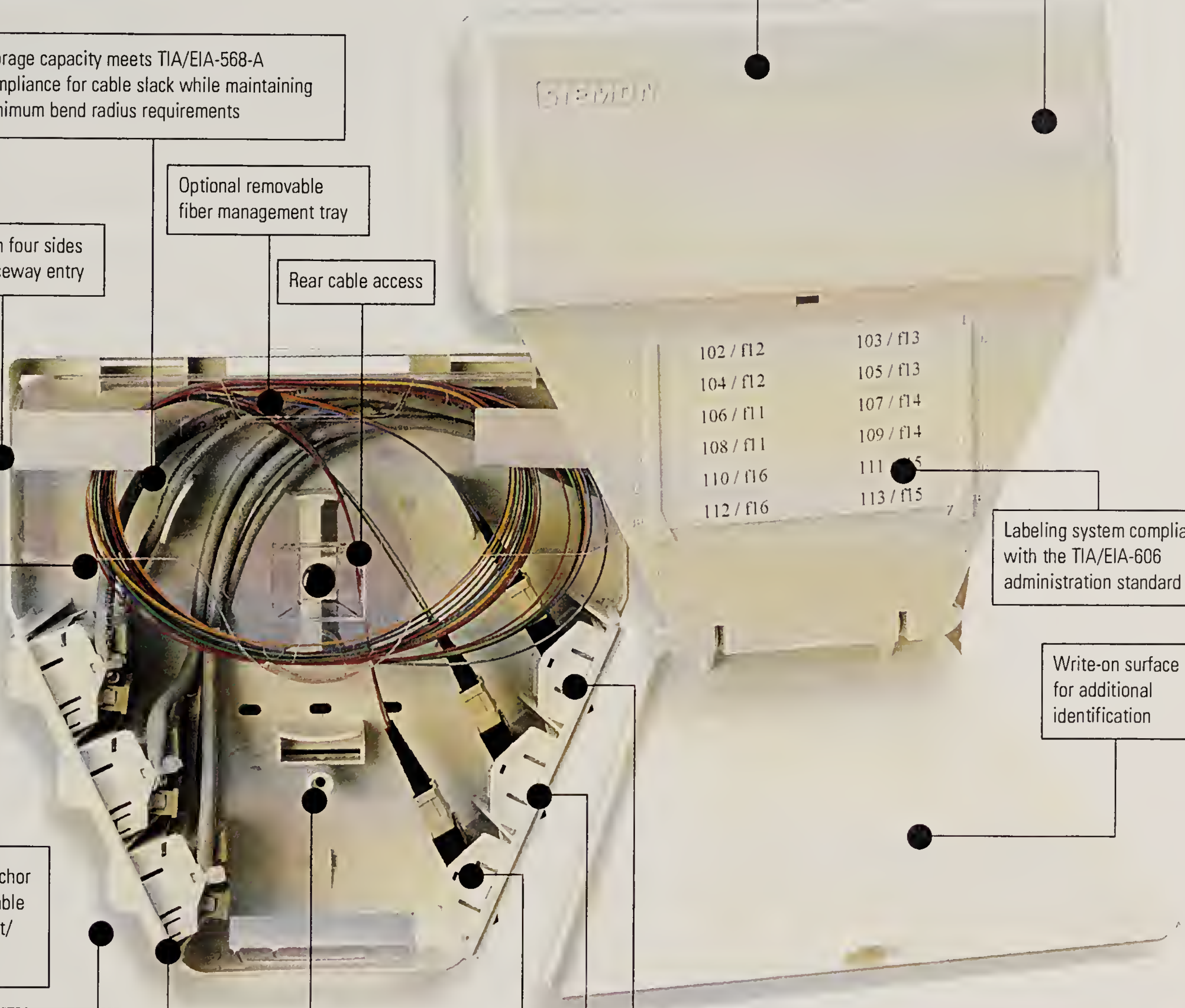
Suite 460 SF,CA 94111

THE NEW CT MULTI-USER/MULTIMEDIA OUTLET

PATENT PENDING



Low-profile; available in white, ivory, black or gray

Compatible with any standard single or double gang electrical box. Screws and adhesive-backed tape included; magnets optional

Storage capacity meets TIA/EIA-568-A compliance for cable slack while maintaining minimum bend radius requirements

Optional removable fiber management tray

Breakouts on four sides for cable/raceway entry

Rear cable access

Labeling system compliant with the TIA/EIA-606 administration standard

Write-on surface for additional identification

Cable tie anchor points for cable management/ strain relief

True "gravity feed" design when used with angled CT couplers

Housing snaps together and a screw is included for added security

Accommodates any combination of up to 12 ports of mixed media or up to 24 fiber ports

Couplers snap into place and can be removed from the front using a flathead screwdriver

Cutouts allow couplers to pass through outlet for mounting following termination

Supports UTP modular jacks, ST and SC fiber, BNC and F-type coax, STP, STP-A, and shielded modular jack connectivity

This low-profile multi-user/multimedia surface mount box is one-of-a-kind in features and flexibility, and is ideal for use as a multi-user telecommunications outlet assembly (MUTO). It accepts any combination of up to six CT couplers (see pages 1-4 to 1-7), providing 12 ports of mixed media or up to 24 fiber ports when used with our fiber couplers. When used with our angled CT couplers, a true "gravity feed" connection is established. The outlet features a unique hideaway labeling system that easily flips down to reveal a designation area that utilizes conventional size designation labels. As with all our CT products, the couplers provide color-coding and can be easily removed from the unit with a small flathead screwdriver.

The CT multimedia outlet provides fiber storage area for up to 12 m (39.4 ft.) of buffered optical fiber cable using our optional fiber management tray and at least 2 m (6.6 ft.) of 4-pair UTP cable in the open base, while maintaining a minimum bend radius of 30 mm (1.2 in.). Adequate strain relief for copper and fiber cables is also provided. The outlet can be mounted on any standard single or double gang electrical box (including European standards) using screws provided, or mounts to any flat surface using adhesive tape or optional magnets. There is convenient cable access at the rear of the unit. Knockouts are provided on both sides, top, and bottom of the unit for cable/raceway entry.

ORDERING INFORMATION

Part #	Description
CT-MMO-(XX)	Multiuser/multimedia outlet box with cable ties, mounting screws and adhesive tape length: 200.2 mm (7.88 in.) width: 200.2 mm (7.88 in.) height: 57.0 mm (2.25 in.)
CT-MMO-(XX)-FMT-(X)	Multiuser/multimedia outlet box with cable ties, fiber management tray, mounting screws, and adhesive tape

Ordering Code:
Use (XX) to specify color: 01=black, 02=white, 04=gray, 20=ivory
Use (X) to specify splice option: Blank=fiber tray-no splice option
1=tray with splice holder for 12 fusion splices
2=tray with splice holder for 12 mechanical splices
3=tray with splice holder for 12 fusion w/sleeve splices

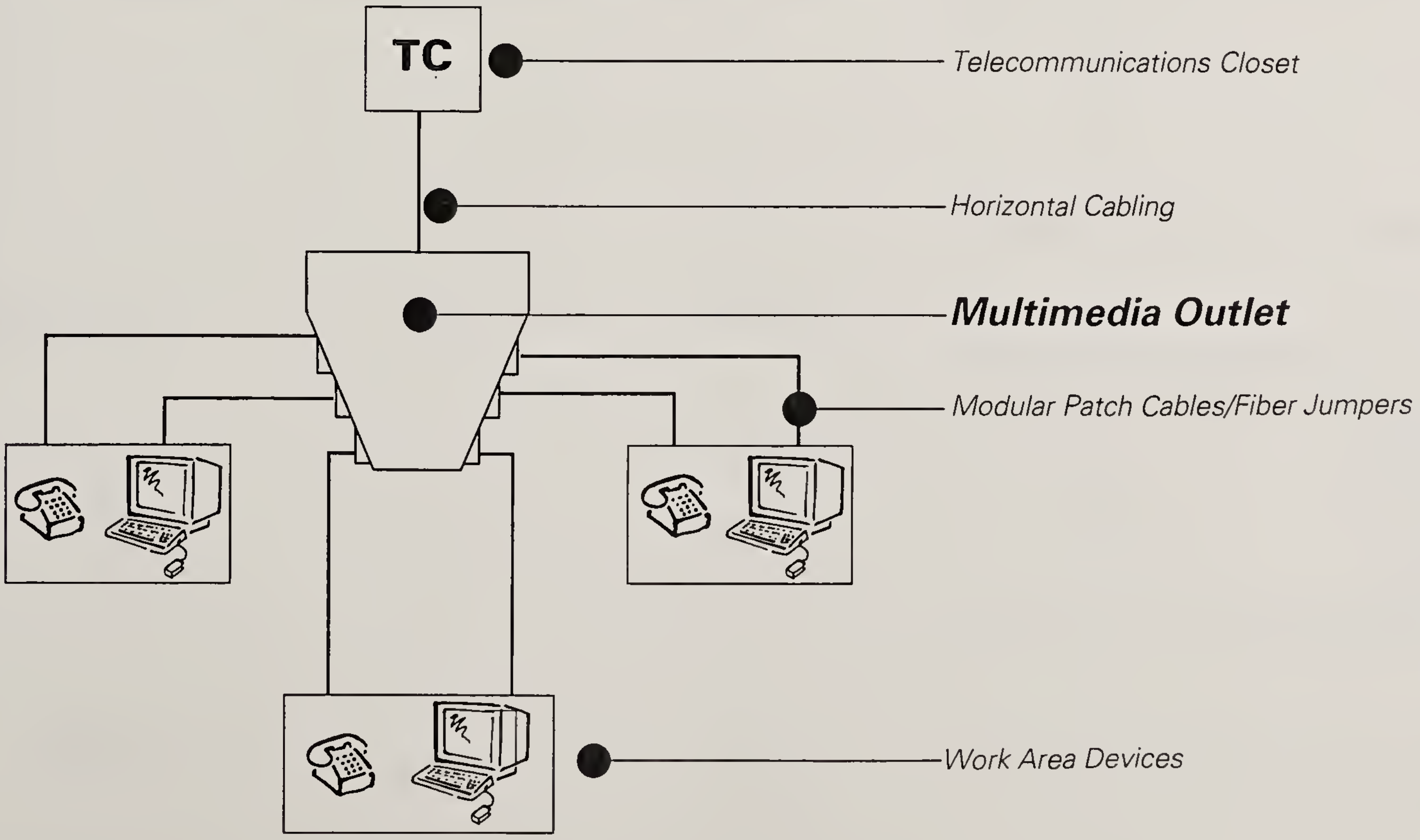
Accessories

Part #	Description
CT-MMO-MAG	Set of 3 magnets for multi-user/multimedia box
FMT-(X)	CT fiber management tray for multi-user/multimedia outlet

Ordering Code:
Use (X) to specify splice option:
Blank=fiber tray-no splice option
1=tray with splice holder for 12 fusion splices
2=tray with splice holder for 12 mechanical splices
3=tray with splice holder for 12 fusion w/sleeve splices

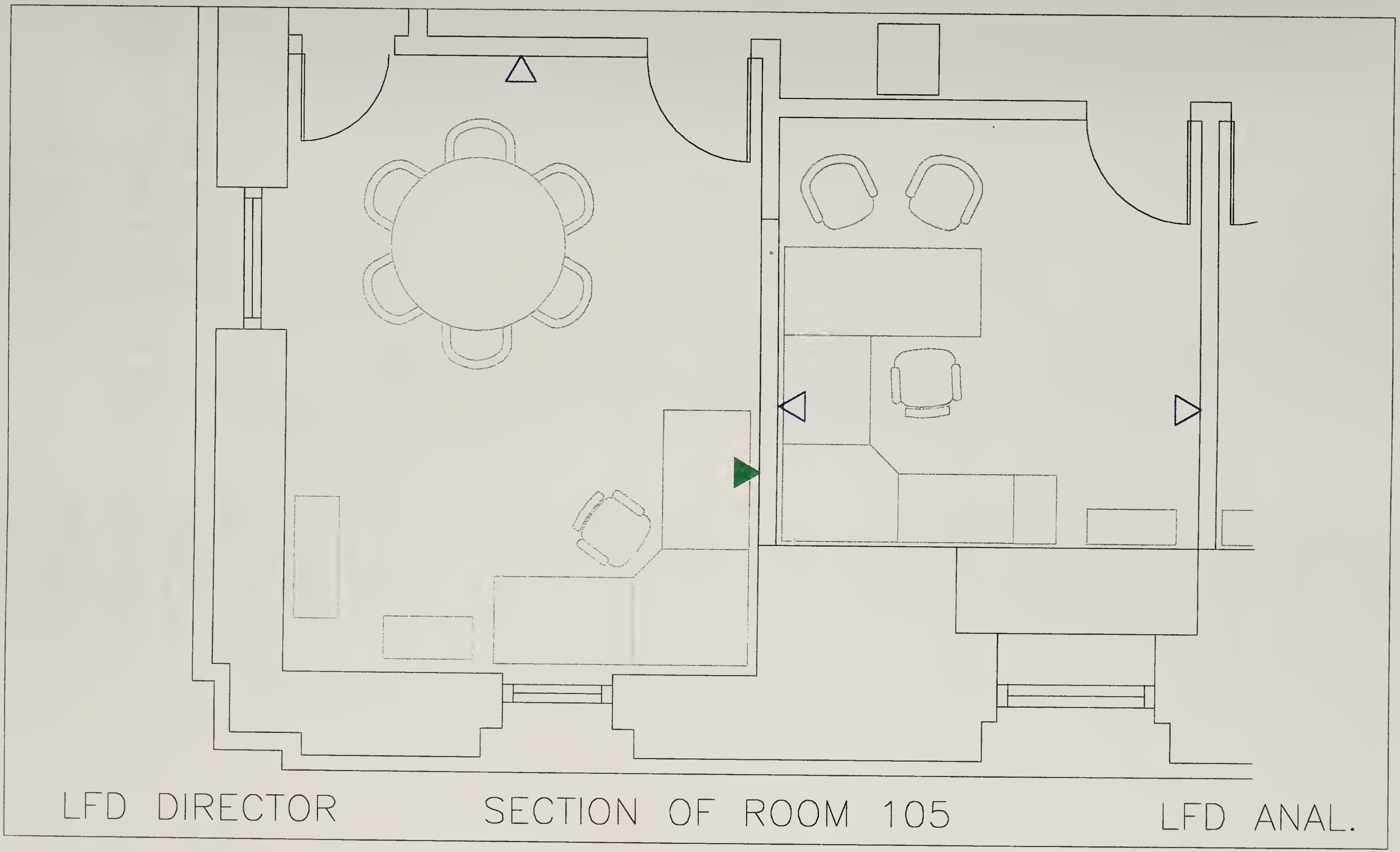
CT couplers must be ordered separately. Please see pages 1-4 to 1-7.

Multi-User Telecommunications Outlet (MUTO)



Narrative: Outline Standards for Typical Rooms

Large Private Offices:	2 outlets:	1 A & 1B at desk
Regular Private Offices:	2 outlets:	1 A at desk & 1 A opposite wall
Office Booths:	1 outlet:	1 A at each counter
Systems Furniture:	1 outlet:	1 A at each desk/work station Every 3 to 4 work stations; on wall or column when possible 1 E type for each T.V. monitor view location. NOTE: cable connect height to be determined.
Conference Rooms:		
Small (under 200 sf):	2 outlets:	1 A type at floor 1 E type at wall
Large (over 200 sf):	3 outlets:	2 A outlets at floor & wall 1 E outlet at wall
Self Contained Shared Office:	Varies:	1 A at each desk/work station 2 A in common area 1 E at wall
Reception Area:	Varies	1 A at each work station 1 E in waiting at wall
Partitionable Hearing Room:	10 outlets:	10' floor outlet grid, length & width from centerpoint of partition as follows: two groups of 4, each with 2A 1B 1C 2 E at wall, in opposite corners
Hearing Room:	8 outlets	Grid varies: 5' x 6' floor outlet grid, length & width, 6 outlets: 3A 2B 1D 2 E at wall, in opposite corners
Surge Areas:		
Formula: 55 sf per person	Varies:	1 C outlet per 110 sf (or two people)



STATE OF
MONTANA CAPITOL

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TITLE:

TYPICAL
LARGE & REGULAR
PRIVATE OFFICE

SCALE: 1/4"=1'
DATE: 3/5/98

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architectual / technology integration
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fax 415 / 765-6571
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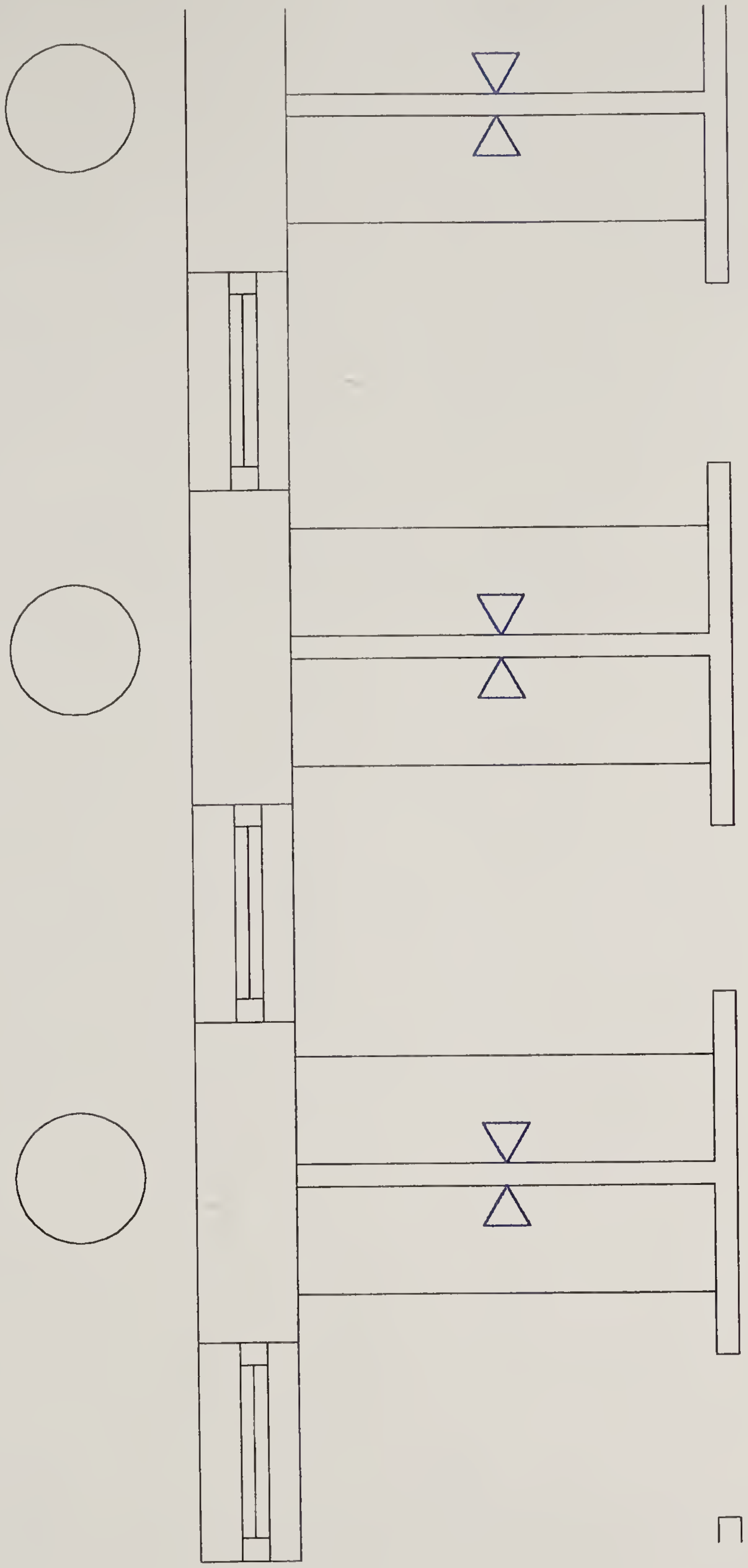

STATE OF
MONTANA CAPITOL

DRAFT

TITLE:

TYPICAL
OFFICE
BOOTH

SCALE: 1/4"=1'
DATE: 3/5/98

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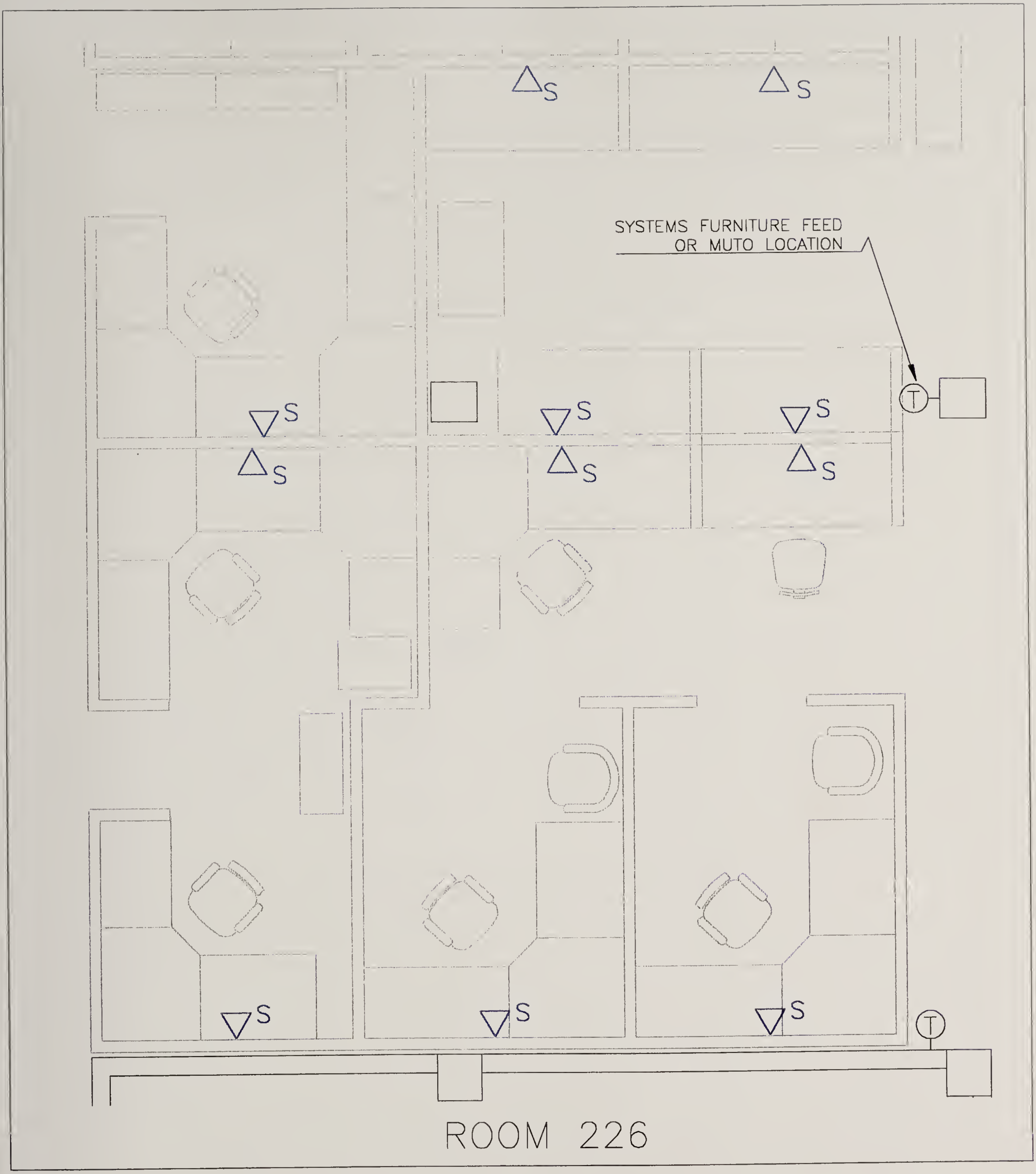


STATE OF
MONTANA CAPITOL

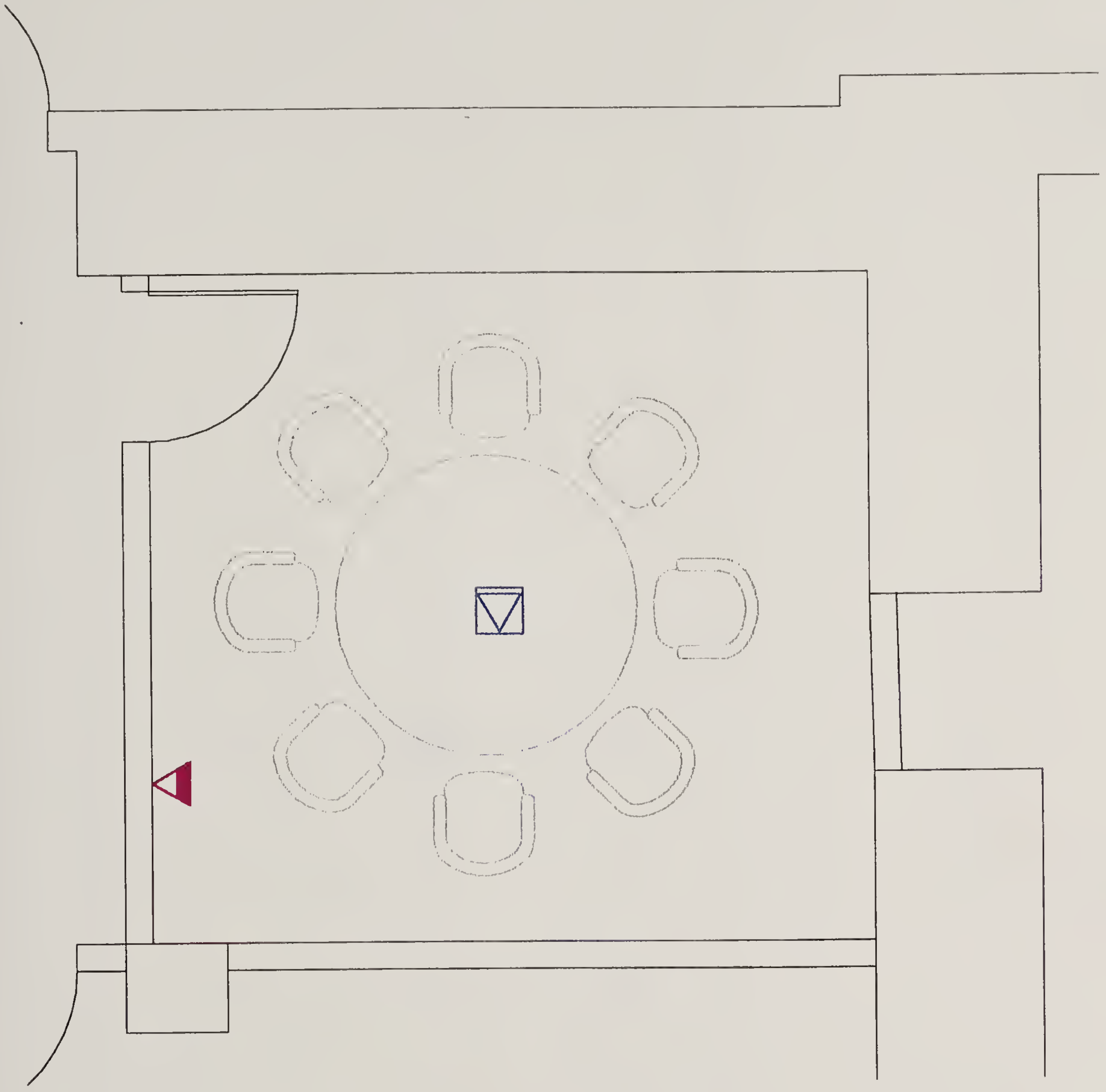
DRAFT

TITLE:

TYPICAL
SYSTEMS
FURNITURE

SCALE: 1/4"=1'
DATE: 3/5/98

KC future planning, inc.



ROOM 4

STATE OF MONTANA CAPITOL

DRAFT

TITLE:

TYPICAL SMALL CONFERENCE ROOM

SCALE: 1/4"=1'

DATE: 3/5/98

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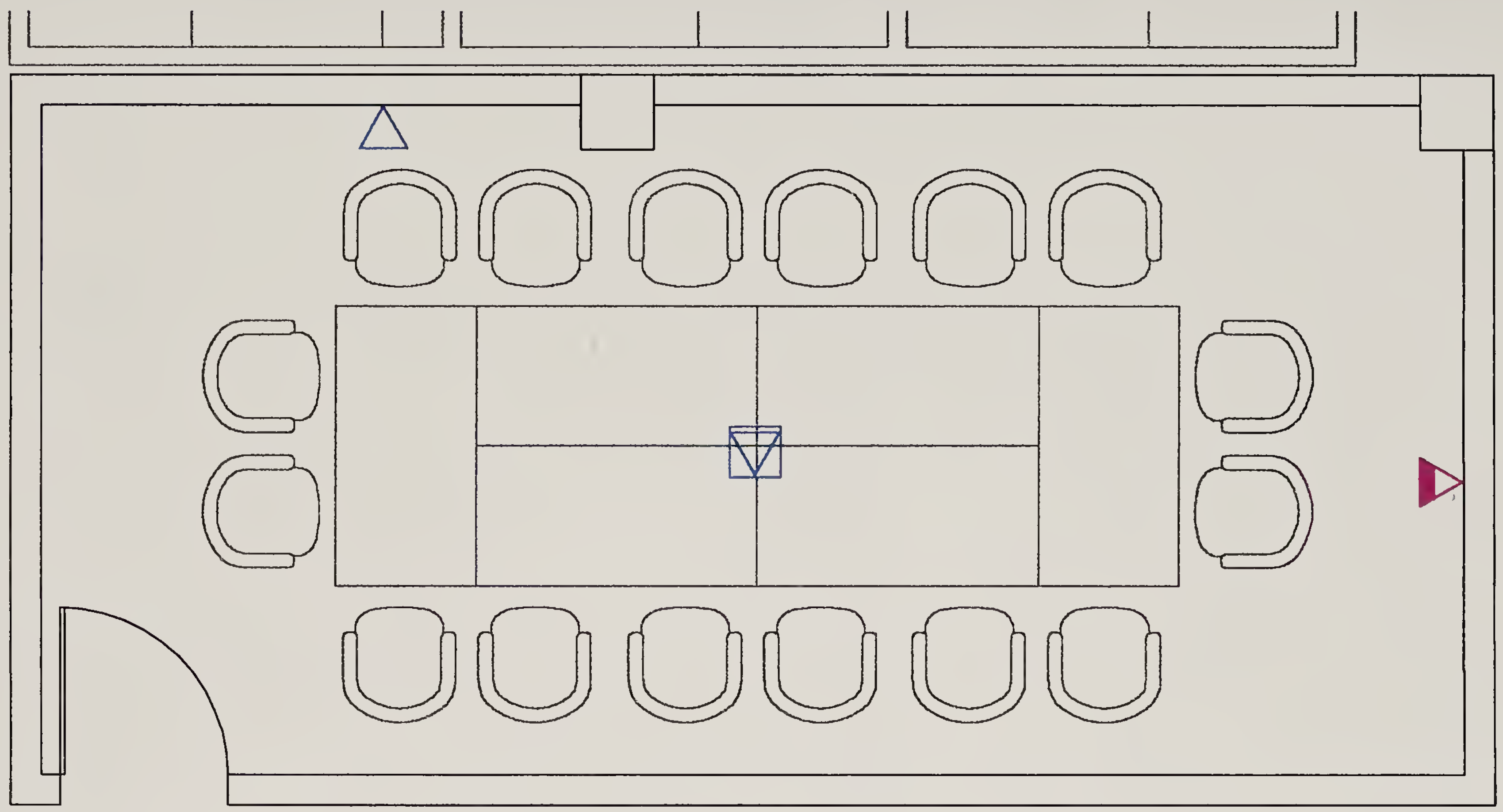

ROOM 227

STATE OF
MONTANA CAPITOL

DRAFT

TITLE:

TYPICAL
LARGE
CONFERENCE ROOM

SCALE: 1/4"=1'
DATE: 3/5/98

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architectual / technology integration
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fax 415 / 765-6571
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Suite 460 SF,CA 94111

STATE OF
MONTANA CAPITOL

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TITLE:

TYPICAL
SELF CONTAINED
SHARED OFFICE

SCALE: 1/4"=1'
DATE: 3/5/98

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fax 415 / 765-6571
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Suite 450 SF,CA 94111

ROOM 233

STATE OF
MONTANA CAPITOL

DRAFT

TITLE:

TYPICAL
LARGE OFFICE
RECEPTION

SCALE: 1/4"=1'
DATE: 3/5/98

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fax 416 / 765-6571

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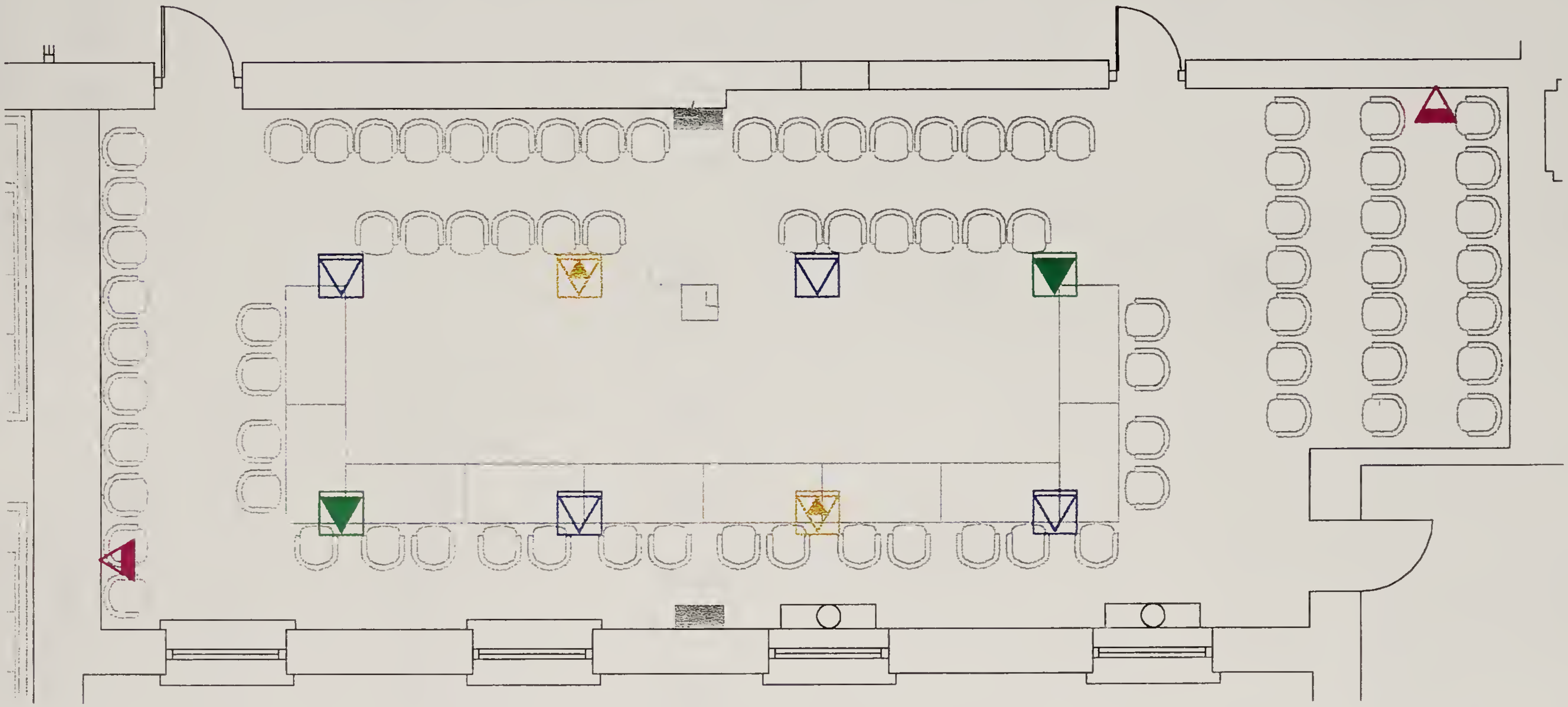
Suite 460 SF,CA 94111



ROOM 103

STATE OF MONTANA CAPITOL

DRAFT

TITLE:

TYPICAL PARTITIONABLE HEARING ROOM

SCALE: 1/8"=1'
DATE: 3/5/98

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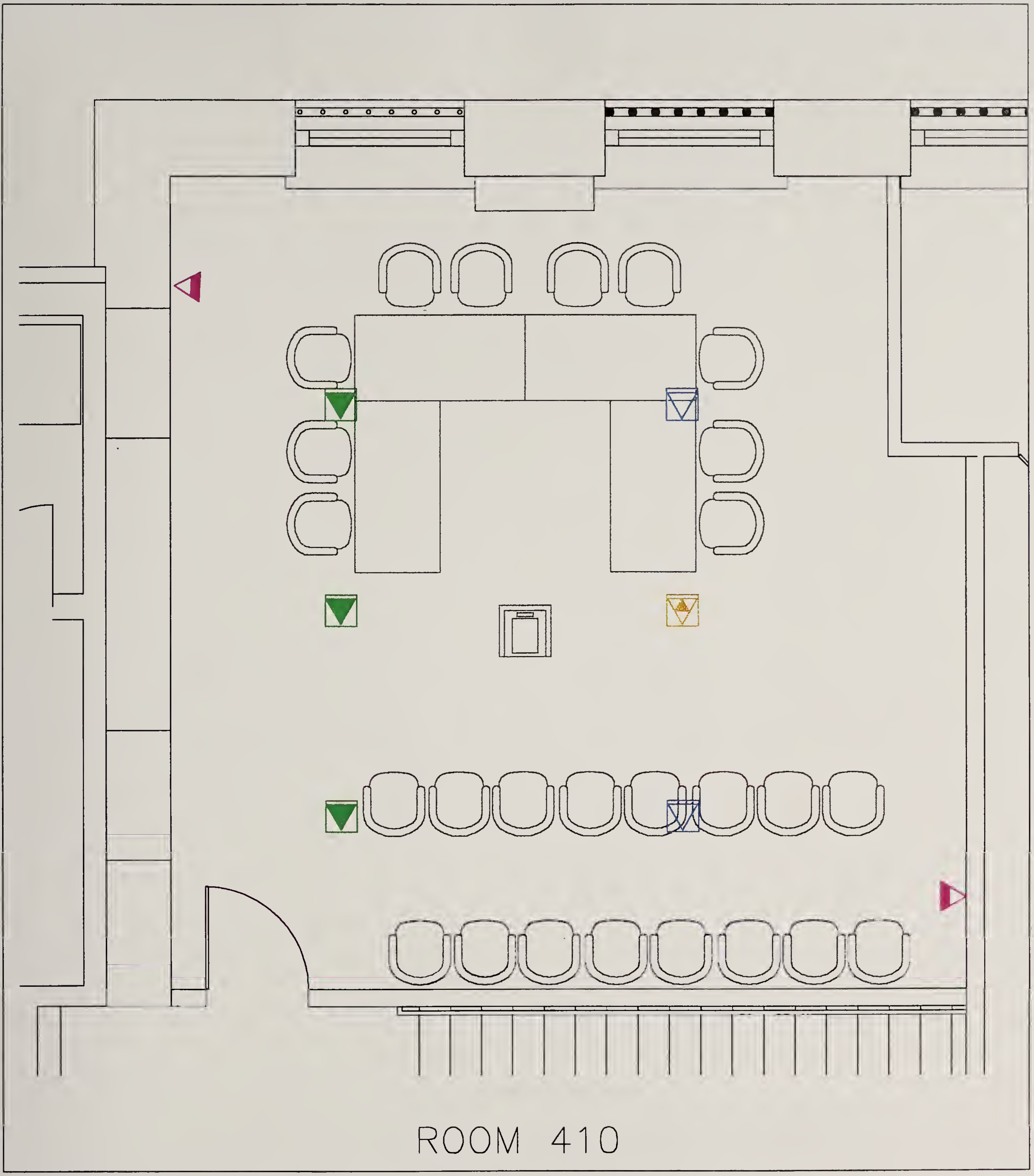

STATE OF
MONTANA CAPITOL

DRAFT

TITLE:

TYPICAL
HEARING
ROOM

SCALE: 1/4"=1'
DATE: 3/5/98

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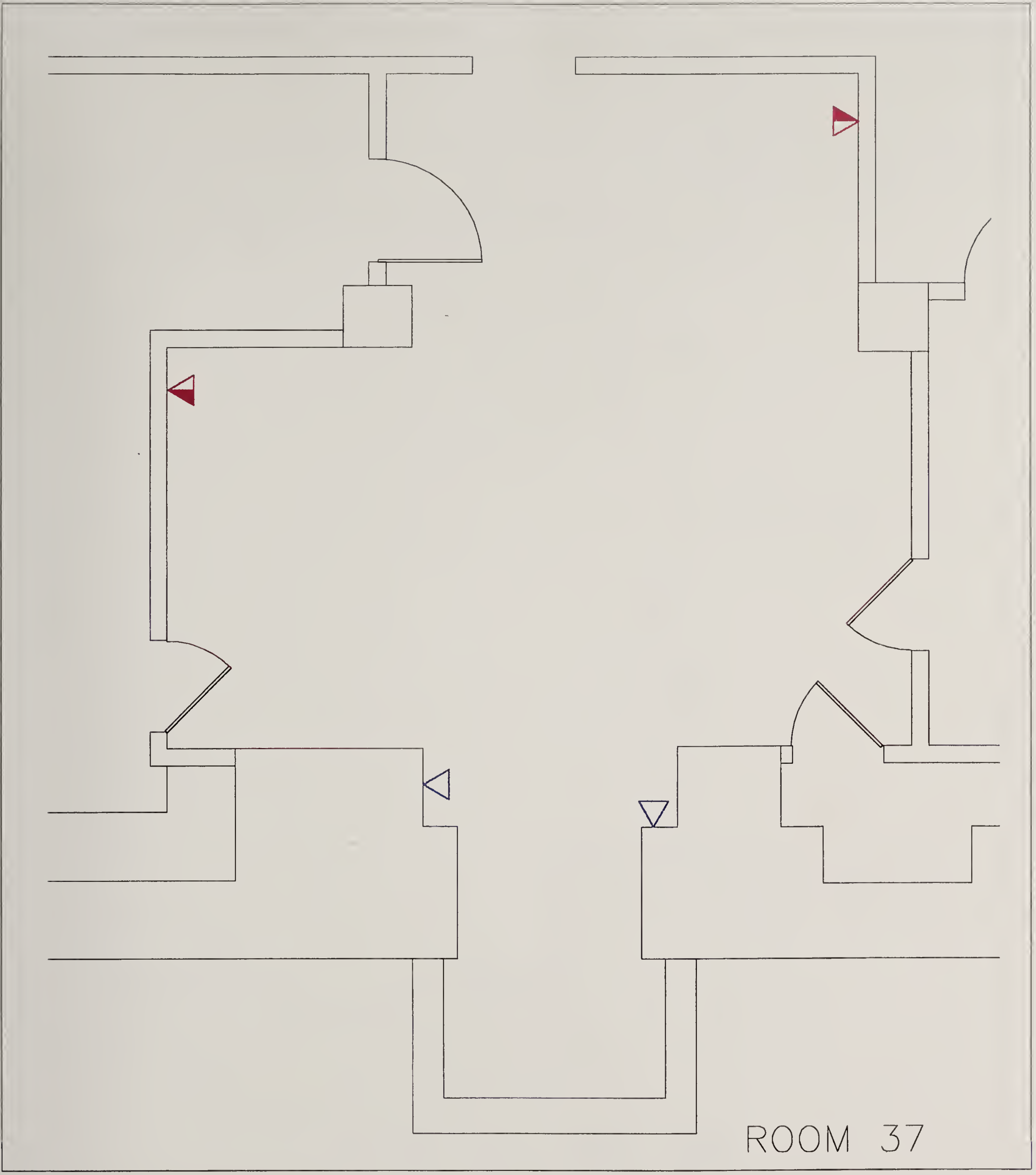

STATE OF MONTANA CAPITOL

DRAFT

TITLE:

TYPICAL SURGE AREA 1

SCALE: 1/4"=1'
DATE: 3/5/98

KC future planning, inc.

**STATE OF
MONTANA CAPITOL**

DRAFT

TITLE:

**TYPICAL
SURGE
AREA 2**

SCALE: 1/4"=1'
DATE: 3/5/98

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Montana State Capitol Renovation
Technology Outlet Count

	East															
	Surge				Assembly				Office				Total			
Floor	A	B[1]	C	D	A	B[1]	C	D	A	B[1]	C	D	A	B[1]	C	D
B	0	0	0	0	0	0	0	0	41	7	0	0	41	7	0	0
1	0	0	3	0	4	4	0	2	65	6	0	0	69	10	3	2
2	0	0	3	0	0	0	0	0	57	13	0	0	57	13	3	0
3	37	2	25	0	6	11	0	6	0	0	0	0	43	13	25	6
4	5	0	17	0	4	10	0	2	0	0	0	0	9	10	17	2
Total	42	2	48	0	14	25	0	10	163	26	0	0	219	53	48	10

Connectors	
RJ45	Coax-F
96	7
180	15
158	16
274	44
144	29
852	111

	West															
	Surge				Assembly				Office				Total			
Floor	A	B[1]	C	D	A	B[1]	C	D	A	B[1]	C	D	A	B[1]	C	D
B	11	0	18	0	0	0	0	0	28	2	0	0	39	2	18	0
1	0	0	3	0	4	4	0	2	89	9	0	0	93	13	3	2
2	6	0	3	0	0	0	0	0	67	8	0	0	73	8	3	0
3	19	8	7	0	2*	1*	*	*	0	0	0	0	19	8	7	0
4	5	0	10	0	6	11	0	2	0	0	0	0	11	11	10	2
Total	41	8	41	0	10	15	0	4	184	19	0	0	235	42	41	4
Total Bldg.	83	10	89	0	24	40	0	14	347	45	0	0	454	95	89	14

Connectors	
RJ45	Coax-F
190	20
234	18
180	11
96	15
108	23
808	87
1660	198

* These counts do not include any outlets in the House or Senate Chambers

1. The count for "B" outlets includes the "E" outlets as a subset.

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TELECOMMUNICATIONS SPECIFICATION OUTLINE

PART 1 - GENERAL

- 1.1 System Description
- 1.2 Scope of Work
- 1.3 Work Not Included
  - A. Work by General Contractor
    - 1. Plywood Backboard
  - B. Work by Electrical Contractor
    - 1. Basebuilding Cable Tray
    - 2. Sleeves
- 1.4 Included Documents
  - A. Drawings
  - B. Cut Sheets
  - C. Bid Form
- 1.5 Glossary
  - A. Parties Involved
  - B. Definitions
- 1.6 Regulatory Standards
- 1.7 Industry Standards
- 1.8 Contractor Qualifications
- 1.9 Project Manager Qualifications
- 1.10 Alternate Products
- 1.11 Warranty
- 1.12 Submittals
- 1.13 Deliverables
  - A. Project Initiation
  - B. Project Completion
- 1.14 Questions

PART 2 - PRODUCTS

- 2.1 General
- 2.2 Backbone/Riser Copper Cabling
- 2.3 Backbone/Riser Fiber Optic Cabling
- 2.4 Backbone/Riser Other
- 2.5 Equipment Racks
  - A. Relay Racks
  - B. Cabinets
  - C. Rack Mountable Electric Strips
- 2.6 Cable Tray
- 2.7 Innerduct
- 2.8 66 Blocks
- 2.9 Utp Patch Panels
- 2.10 Fiber Optic Patch Panels
- 2.11 Cable Management
  - A. 110 Blocks
  - B. Relay Racks
    - 1. Horizontal

- 2. Vertical
- 2.12 Station Cable
  - A. Category 5 UTP
  - B. Other
- 2.13 Jacks
  - A. Data/Voice
  - B. Other
- 2.14 Faceplates
  - A. Wall Plates
  - B. System Furniture
  - C. Other
- 2.15 Patch Cords
  - A. Copper
- 2.16 Firestopping

PART 3 - EXECUTION

- 3.1 General
- 3.2 Site Preparation
- 3.3 Field Examination
- 3.4 Backbone/Riser Cable Installation
- 3.5 Equipment Racks
- 3.6 Cable Tray
- 3.7 Innerduct
- 3.8 66 Blocks
- 3.9 Patch Panels
- 3.10 Cable Management
- 3.11 Support And Routing Of Cables
- 3.12 Station Cable Installation
- 3.13 Technology Outlets
- 3.14 Patch Cords
- 3.15 Cross Connects
- 3.16 Fire And Smoke Partition Penetrations
- 3.17 Grounding And Bonding
- 3.18 MDF
- 3.19 IDF
- 3.20 Naming/Labeling Scheme
- 3.21 Testing
  - A. Category 5 Cable
  - B. Backbone Copper Cable
  - C. Fiber Optic Cable
  - D. Coaxial Cable
- 3.22 Cable Documentation
- 3.23 Inspection
- 3.24 Training
- 3.25 As-Built Drawings
- 3.26 Acceptance

END OF SECTION

SYSTEMS DESCRIPTION

It is our intent to provide the physical infrastructure necessary to support all of the technology systems that will be used today and in the future at the State Capitol. The following is a list of these along with a description of how they will be supported by the infrastructure upgrade.

	SYSTEM	REQUIREMENT	INFRASTRUCTURE SUPPORT	COMMENTS
I.	VOICE			
	▪ Telephone Service	Current	Hard wired cable to each phone location, through campus system to ISD phone switch.	
	▪ Private Cellular Phones	Current	None	Provided by others
	▪ State Cellular Phones	Future	Upgrade to current phone system and possible equipment within Capitol	
	▪ Private			
	▪ Press Use	Future	Hard wired cable to each phone locations from US West demarcation.	
	▪ Pay Phones	Current	Hard wired cable to each phone locations from US West demarcation.	
II.	DATA			
	▪ LAN			
	▪ 4/16 Mbps token ring	Current	Hard wired cable to each data connection to active network equipment in IDFs.	
	▪ Local File Service	Current	Connection from data connection to server location in tenant space or centralized MDF.	
	▪ Internet Access	Current	Connection from data connection to Campus backbone.	
	▪ Mainframe			
	▪ State Access	Current	Connection from data connection to Campus backbone.	
	▪ WAN	Current	Connection from data connection to Campus backbone.	
	▪ Wireless			
	▪ LAN	Future	Transmitter locations with power and environmental control.	Currently under investigation for use in Capitol.

	SYSTEM	REQUIREMENT	INFRASTRUCTURE SUPPORT	COMMENTS
III.	AV			
	▪ Closed Circuit TV (CCTV)	Future	Coaxial cable from broadcast locations to central location for broadcast to building and state.	Local Cable Provider (TCI) would require access to headend to broadcast to state.
	▪ Audio Distribution	Current	Hard wired from audio systems or from central broadcast location.	Could be integrated with MATV system.
	▪ Kiosks	Future	Power and data connection to LAN and possibly video.	Could be integrated with MATV system.
	▪ Cable TV	Future	Coaxial cabling from TV location to cable provider or headend.	
	▪ Media Access	Current	Cable system from media headend to points of media interest.	Current locations will change as space uses change.
	▪ In-Room Projection of Network Accessed Information	Future	LAN connection and network ready presentation device.	Rooms will also need design considerations reviewed, such as acoustics and lighting.

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Montana State Capitol
Wireless LAN
Overview

Prepared By:

KC / future planning, inc.

Communications Networks
Audio/Video Systems

March 5, 1998

Table of Contents

Introduction

The Montana State Legislature has embarked upon a technology utility infrastructure upgrade within the State Capitol facilities. A portion of this upgrade includes augmenting the existing data network installed within the facilities. It is the intent of Legislature Services to support a high-speed (minimum 100 Mbps), networked information exchange into the next century.

The task of installing the physical layer (e.g., cable conveyance, cabling, and distribution components) is currently being addressed. At issue is how to create a robust infrastructure that will support current state-of-the-art systems, and allow for the incorporation of new technologies as they may become available in the future – without substantially altering the historical architectural elements associated with the facilities, while adhering to the inevitable budget constraints.

It is our understanding that a combination of both wired and wireless networks is being considered for use in the upgrade. The wired solution would be employed throughout the backbone cabling and within areas that are currently suited for installing wired systems (e.g., areas without historical architectural value, areas with raised flooring, etc.).

The wireless solution is being investigated to minimize the impact (both aesthetic and budgetary) associated with the installation of the network cabling. Primary locations that would benefit from the deployment of wireless technology are the Senate Chambers and other areas requiring highly mobile connectivity. The results of our preliminary investigation into appropriate wireless solutions are presented herein for review.

Technology Overview

Historically, associated advances in cabling technology have supported innovations in network signal transport technology. Over the past five (5) years, network transmission speed over cable media has increased from 10 Mbps to 1Gbps (or by a factor of 100). In the same time frame, wireless LAN transmission speeds have increased from 2 Mbps to 10 Mbps (in select systems).

Both wired and wireless systems offer advantages and disadvantages. Wired systems are generally selected where high-speed, reliable systems are required. Wireless systems are employed in areas where cabling cannot be easily installed and in areas where high mobility is required.

The two solutions can be summarized as follows:

Wired Connectivity

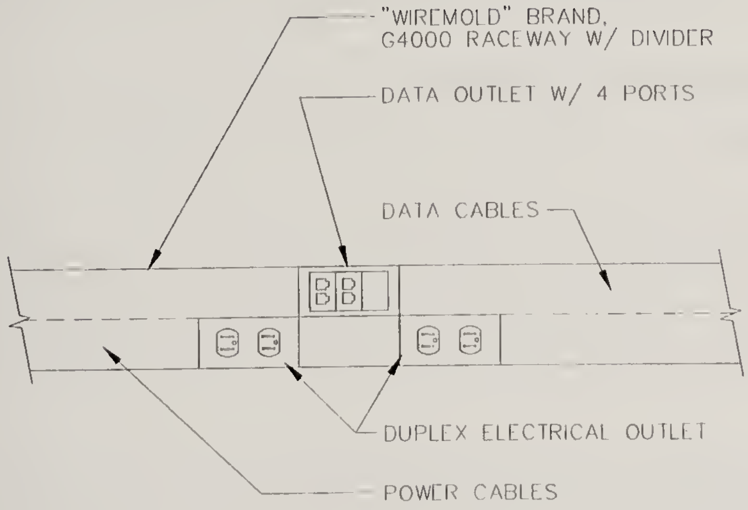
Wired connectivity between distribution points (hubs) and station outlets offer the following main advantages:

- high reliability of service
- high-speed / high-bandwidth connectivity (currently up to 1 Gigabit-per-second transfer rates)
- good security

The main disadvantages of wired station connections are:

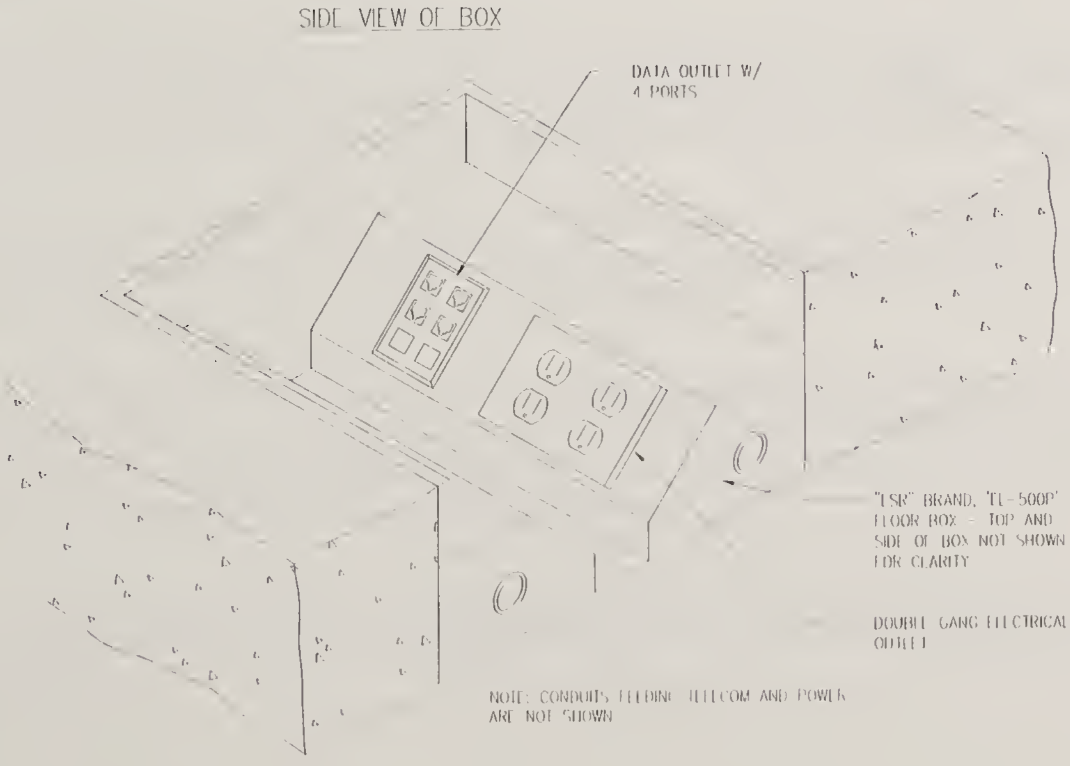
- relatively high cost of initial installation (the cabling cost can be as high as 40% of the installation)
- substantial cost for upgrade (replacement of cabling and re-termination)
- potentially adverse aesthetic impact on existing architecture

One approach to providing wired data connectivity to each station is to install high-speed data cabling between a local hub and each technology outlet. This approach could integrate well with the distribution of electrical service via a Wiremold raceway system. Cabling would emanate from the hub, or from a patch panel intermediate to the hub, and run through the raceway to Technology Outlets.



Technology outlets could be deployed on Wiremold adjacent to electrical receptacles. The technology outlets could be configured to support four (4) connections at each outlet. This configuration relates well to the standard double-duplex electrical receptacle that can also support four connections. An example of this method of network cabling is illustrated at left.

A similar method of wired cabling would be to install conduits running from a main junction box near the hub for cable conveyance to floor boxes containing both data jacks and electrical receptacles. This method can be illustrated as follows, and may be appropriated for areas such as the House Chambers that possess raised flooring.



Wireless

Wireless systems offer the following main advantages:

- Installation cost is typically lower than that of wired systems
- High mobility is promoted
- Systems can be installed in areas where station cabling cannot
- Instant deployment and / or LAN extension
- Low maintenance cost
- Immediate Disaster Recovery

The main disadvantages of wireless LANs are:

- Potential security problems (depending upon the specific wireless solution selected)
- Relatively low speed transmission capabilities

There are two main technologies used to develop a wireless network: radio frequency (RF) and infrared (IR). RF methods are more complex, but they provide a full mobility and wide range of coverage. While IR is easier to implement and no license is required, the coverage is restricted to a single room or line-of-sight, point-to-point links.

Current technologies offer up to 10 Mbps transfer rates, and wireless connectivity between computers and the local classroom hub. Although 10 Mbps wireless technology is still developing, two manufacturers have produced stable Wireless LAN systems that should be considered.

Radio Frequency Based Wireless Ethernet

RF TRANSMISSION

There are two main methods to implement a RF link: narrow band and spread-spectrum techniques. Narrow band modulation schemes have problems with multipath transmission and they are very sensitive to interference, so spread-spectrum technology (SST) is preferred.

In 1985, the Federal Communications Commission (FCC) allocated the so-called industrial, scientific, and medical (ISM) bands for LANs using spread-spectrum techniques. These bands are 902-928 MHz, 2.4 - 2.8385 GHz and 5.725 - 5.85 GHz.

The Institute of Electrical and Electronic Engineers (IEEE) has also focused the presumed necessity of a standard in Wireless LAN. The family of IEEE 802 standards has been a real success in the international standardization of LANs. Within this family, a new working group, known as P802.11, is developing a standard for Wireless LAN.

Among SSTs, the most promising is code-division multiple access. In this case, a single code is assigned to an emitter inside a cell. If the emitter moves to another cell, a new code is given to continue transmission.

SECURITY

As RF signals propagate through the walls, data security is an important subject to be considered, and so encryption is mandatory to avoid information leakage. Data encryption is mandatory for Wireless LANs.

VIABLE RF SYSTEMS

Based on our research, RadioLan is the only manufacturer currently offering 10 Mbps networking via wireless RF transmission. The RadioLan offering features Ethernet via wireless RF transmission that does not require a FCC license for operation. The company has reintroduced its proprietary system following substantial reengineering and testing. The system as offered may be suitable for the Chambers application, as the distance limitation within an enclosed area is 120 feet between the stations and the link to the backbone.

The basic RadioLan system include a wireless transceiver / antenna that can be connected either to a desktop computer using the supplied ISA adapter, or a laptop using a special PCMIA card provided with the transceiver. The system supports up to 128 users and provides wireless connectivity between the transceiver/antennas and a translational bridge that can be cabled to an existing Ethernet networked hub. Currently, there is no hub offered as part of the system.

This basic configuration creates a local peer-to-peer network that is addressable at the bridge using an assigned IP address. RadioLan provides network management tools to facilitate this IP assignment.

Advantages of this approach are:

- Computers can be easily moved about an area without concern for cable management or lack of connectivity.
- Line-of-sight between the nodes (networked computers) and the Network Bridge is not required, as it is in an infrared wireless system.
- No additional power is required for transceivers attached to computers. Transceivers could run off laptop batteries (albeit the drain on the batteries would be substantial).
- Connection to the existing Capitol Network is simplified.

Disadvantages appear to be:

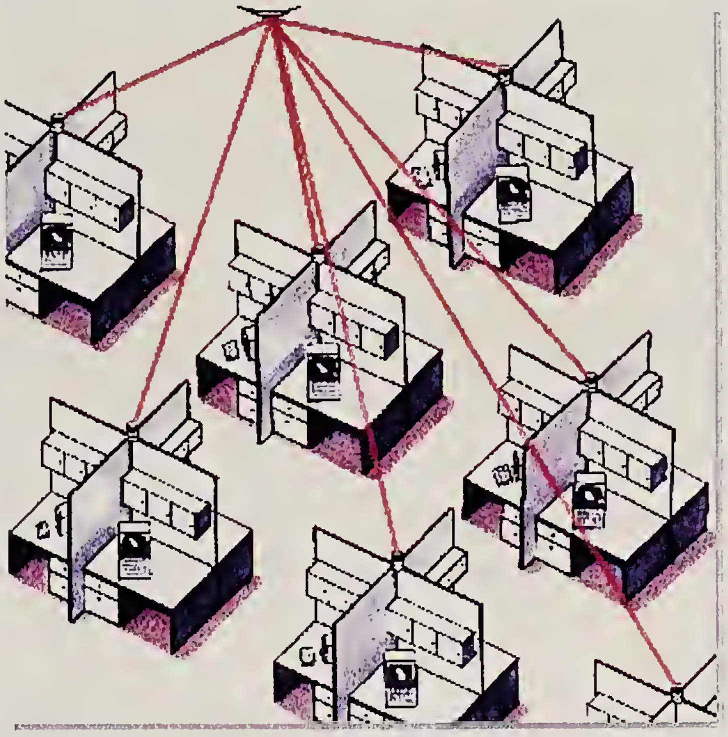
- Wireless RF systems may not be suitable for adjacent rooms due to the possibility of interference, unless the adjacent areas are part of the same peer-to-peer network.
- Transmissions are susceptible to security violation.
- The network interface cards installed as part of the RadioLan system do not afford compatibility with standard "wired" access points that may be installed elsewhere within the Capitol.
- Proprietary network drivers are required which may require additional technical support by Capitol staff.
- The RadioLan topology does not support the existing Token-Ring topology.

Infrared Based Wireless Ethernet

The other possibility for wireless connectivity is infrared transmission technology. This technology provides many of the benefits of wireless RF, while overcoming several of the disadvantages.

IR systems rely on an infrared transceiver (satellite) that communicates with multiple "nodes" that are wired directly to the computer requiring connectivity. The Satellite is typically mounted on the ceiling in a central location that can be "seen" by each Node. The Satellite is hard-wired to a local hub for connectivity to the backbone portion of the network.

When compared with RF technology, the IR-based systems appear to be a more viable alternative to a wired solution. The general system configuration for open office environments is shown (right). This configuration could be modified for use in the Senate Chambers.



ETHERNET IR

Our research indicates that the VIPSLAN-10 system manufactured by JVC Corporation is the best candidate for the Capitol. The JVC system is the only IR-based wireless LAN we discovered that would transmit at the 10 Mbps rate. The only major drawback is the lack of support for Token-Ring.

In the JVC system, groups of four (4) workstation computers (or laptops) can be connected to a transceiver Node using standard CAT5, 10BASE-T Ethernet cabling. The Nodes deployed within a room transmit / receive an infrared signal to/from a ceiling-mounted Satellite module, which can be connected to a standard networked Hub. Individual Satellites can support multiple Nodes up to a distance of 16 ft. This specification would require that multiple Satellites be installed within the Chambers.

All transmission is IEEE802.3 and Ethernet II compliant.

Advantages of the JVC system are:

- Standard network interface cards can be used.
- Potential interference between adjacent rooms is eliminated.
- Security is preserved as all transmission takes place in full view.
- System is compatible with standard Ethernet network drivers.

Disadvantages appear to be:

- Nodes require electrical power for DC adapter.
- Cabling between Satellite and Hub must be run above, or across ceiling.
- Satellite requires power at the ceiling.
- Support for Token-Ring is not available.

Manufacturer's literature for the JVC System has been appended for review.

TOKEN-RING IR

Our research has revealed one manufacturer that is distributing a 16 Mbps Token-Ring wireless solution. InfraLan Wireless Communications (18 Kinsley Road, Acton MA 01720, (508) 266-1500, infralan@plxs.com) has released product information for an auto-sensing 16 / 4 Mbps Token-Ring system.

Unfortunately, we were unable to obtain technical information or detailed pricing for the products. However, we have appended literature for this product that may further your review.

Wireless System Costs

We have appended manufacturer's list pricing, along with the technical literature, for the RadioLan and JVC products. Specific system costs can be developed once a specific service area and building network integration scheme have been identified.

Deployment Considerations

The deployment of a Wireless LAN should be carefully reviewed and compared with a similar wired solution. In many cases, power must still be provided for the computers (laptops) that are to be connected to the Wireless LAN. The installation of conduit and back boxes associated with the installation of electrical receptacles present the same problems as does the infrastructure required to support a wired solution.

If electrical receptacles must be installed to service the station (e.g. within the Senate Chambers) and ***mobility*** is not a primary requirement, then a wired solution should be chosen and integrated with the electrical distribution system.

Appendices

We have appended reference literature associated with the range of Wireless LAN products currently available, and specifically those products recommended within the body of this report.

Reference Materials

Preliminary Design Program
for
Montana State Capitol Renovation
A/V Upgrade

Prepared By:

KC / future planning, inc.

Communications Networks
Audio/Video Systems

March 5, 1998

Table of Contents

Introduction

The following is a design program of the Video, Audio and Wireless Services desired within the Capital. This program is a result of the information gathered at the previous meeting at the Capitol on February 10, 1998 by KC Future Planning, Inc.

This program will provide a description of systems that will be needed to support the desired services, what their capability will be, and what infrastructure will be required to support these services.

Additionally, this document will provide a preliminary equipment profile, expressed as a costed equipment list to provide a basis of cost for each system. These costs will include the estimated installation costs as well as the equipment costs. Please note that the attached costed equipment list does not include costs of Lighting, Acoustical Upgrade, Electrical Upgrade, or other Construction costs.

System Requirements

What follows is a brief summary of the various services desired at the Capitol.

Closed Circuit TV (CCTV)

A system is desired to facilitate the broadcast of an event to overflow audiences in secondary spaces. Additionally the CCTV system would be used to post daily event activities and other information at various locations around the Capitol. Additionally, the future ability to re-broadcast hearings to the schools around Montana was expressed.

Audio Distribution

There is an existing system consisting of approximately 70 speakers around the Capitol grounds. These speakers are currently switchable between one of two sources and are used to monitor either the Senate or House Chambers. Additionally access to room 325 is available only via a limited number of dial-up telephone lines.

There is a requirement to expand the system within the Capitol both in terms of number of sources and in the number of speakers—specifically, every Legislator's office needs to have access.

Kiosks

Several Kiosks are required to be located in public areas within the Capitol to display daily event activities and other information (similar to the desire expressed in CCTV 2.01 above). Additionally, these Kiosks are to replace the existing Public Terminals.

Cable TV

There is a desire to distribute Local, National, and International news to various locations around the Capitol Complex.

Media Access

Additional infrastructure will need to be added in order to support a third network Affiliate. Please see section 5.0 (Architectural Considerations) for further requirements for this item.

In-Room Projection of Network Accessed Information

All hearing rooms and assembly rooms are required to be outfitted with projection screens.

Several rooms shall be targeted to be outfitted with full A/V presentation capabilities in order to project Network Accessed Information and other A/V presentation source material to large audiences.

Proposed Systems

After careful research of various technologies to provide the services outlined above, we have devised an integrated system that will provide the services required. An added benefit of this integrated system is that it provides a cost-effective way to buy into this system because of the reduced infrastructure overhead needed.

A comprehensive MATV system is proposed that will provide the services outlined above in 2.01...2.04. That is: Closed Circuit TV, Audio Distribution, Kiosk Information, and Cable TV will all be serviced by this same system.

The Capitol will be improved with MATV wiring to each office, meeting room and public space as part of the A/V base infrastructure upgrade. In many instances the MATV connection will share the Voice/Data outlet plate and this will become the *standard Multi-Media Outlet complement*. This will facilitate future additions of TV receivers or TV Projection Systems as needed (and when funding becomes available), on a piece by piece basis once the Infrastructure and Video Headend is in place.

The MATV Video Headend will typically require four(4) racks of equipment and should be located in an air-conditioned room that is at least 80 square feet in size.

Typical MATV Video Headend

The following addresses how the proposed MATV system delivers each service.

Closed Circuit TV (CCTV)

The MATV system will include three TV channels that are used to carry or "broadcast" events "as they happen" to TV sets or Projection Systems located in "secondary spaces" throughout the Capitol Building.

Selected rooms such as the Senate Chambers and House Chambers will be outfitted with remote controlled cameras. Video, Audio, and control lines will be installed from these rooms to the Video Headend.

A terminal located in the Video Headend Room will control information displayed on a "BANNER CHANNEL" that will be used to post daily event activities and other information.

The selection of live events to be broadcast from the Capitol Building will be controlled at a source switching panel at the Video Headend. This allows non-technical personnel to select the signal that will be broadcast.

Reverse channel capability from the Video Headend will allow the broadcasting of events at the Capitol Building via the local cable provider for distribution to homes and schools using the already existing TCI cable system.

Should it be desired to instead broadcast using MetNet or similar carrier, the source for the broadcast will still come from a simple source selector switching panel at the Video Headend.

As part of the upgrade required for live event broadcasts, a separate equipment schedule is provided for equipment that is needed for each room that will be originating broadcasts. Typically, the equipment will include the camera(s) and microphones necessary to provide this source signal and to transport the signal back to the Video Headend. At the Video Headend, a control panel will be provided to select the sources that are to be broadcast and will be simple in operation so that sources may be selected by non-engineering personnel.

Audio Distribution

Audio sources will be delivered via the MATV system on several TV channels. Expansion of additional channels may be accomplished at low cost. An inexpensive TV installed in each Legislator's office will provide not only the desired capability with expansion capability, but will also provide access to the BANNER CHANNEL which will provide current information such as hearing times and dates. The savings realized in using this approach as opposed to expanding the current system are best understood when the cost of running additional speaker lines, (unknown quantity—not expandable), and modifying each and every of the approximately 70 installed speakers is compared with the proposed system.

The MATV system will be run in parallel with the existing 70 or so speakers and with the existing dial-up line to room 325 so that continued auditioning and selection of one of two sources will still be possible in locations where a speaker currently exists. We are allowing for 5 audio channels in this proposal (an increase from two channels currently installed).

Kiosks

The MATV system will feed a TV set in each Kiosk located in the Capitol Building. The TV may be preset to display the BANNER CHANNEL. A (unspecified at this time), computer terminal or networked computer may share the Kiosk space to provide additional access and to satisfy the need to replace the existing terminals. Should it be desired to display the BANNER CHANNEL on the computer monitor and eliminate the TV set, it is only necessary to ensure that the computer specified has an integrated cable-ready tv tuner card.

Cable TV

The MATV system will distribute several selected channels of the local TCI cable carrier's programming. We are allowing for 6 channels within this proposal.

In-Room Projection of Network Accessed Information (Presentation Rooms)

Each of two selected rooms will be configured to project common video and computer sources. Each room will be upgraded with an electrically operable projection screen, high-quality, front-screen video projection system with separate speakers, and a complement of source and control equipment located in custom millwork. Video sources shall include Video overhead Projector, Laptop Computer for network access, S-VHS VCR.

A touch screen operated control system shall facilitate selecting and viewing of any source as well as control of the VCR, the projection screen, the Mechoshade window blinds, and will provide control of Volume, and lighting levels.

Equipment

The following is a list of major components for use in systems integration within the systems/rooms identified. This list is presented primarily to give the viewer some insight into the level of quality that this design proposal strives to achieve. Not all components required are listed. Refer to attached Equipment Schedule for more detailed equipment list and associated costs.

MATV Video Head End

☐ Video Modulators (provide signal for each channel to be viewed)

☐ Video Processors (process selected incoming TCI cable channels for distribution within Capitol Building)

☐ Fiber Transceivers (provide interface to/from TCI fiber)

☐ Video monitoring, switching, testing (used to view and evaluate signals)

☐ Character Generator (used to provide BANNER CHANNEL video source)

☐ Video/Audio Router (used to select sources for 'on-air')

☐ Audio Modulators (provide signal for each audio channel)

☐ Video Loss Detectors (automatically select black when no signal)

☐ Launch Amp (provide RF signal to distribution closets)

☐ Extender Amps (provide signal boosting for horizontal distribution)

Equipment Needed for CATV Source Origination Rooms

Equipment needed in each room that will originate a hearing or meeting.

☐ Video Camera/Mount/Lens/Remote Pan/Tilt Assembly

☐ Mixer for Audio Tie-In

Audio Distribution Equipment Needed for Source Origination Room

☐ Mixer for Audio Tie-In

Equipment Needed in Video Kiosks

☐ Screen Color Television

☐ (undefined at this time), Networked Computer system

Equipment Needed in Selected Presentation Rooms

The projection systems may also project live event channels from the MATV system for use as secondary spaces for event overflow crowds.

☐ NEC MT1000 High quality rear screen projection system for use in the Presentation room. Selecting best cost/performance ratio.

☐ Stewart Electrically Operable Projection Screen

☐ Panasonic PV-S4670 S-VHS VCR

☐ Extron Interface for laptop

☐ Extron 4LDex RGB source switcher

☐ Elmo Visualizer

☐ Bryston 3B ST Power Amplifier

☐ Tannoy 12 DMT II Speakers

☐ Rane Equalizer

☐ Crestron Touch Screen

Architectural Requirements

Video Head End

A room will need to be located to house the Video Headend. This room will house all major video and audio processing and switching gear. Additionally, the main MATV signal will be distributed from this point to all subsequent distribution closets throughout the Capitol Building.

Senate and House Chambers

Remote controlled cameras will be installed in these rooms and all other rooms that are subject to program origination.

Typically, one camera assembly will be wall mounted at the rear of the room facing the front and one camera assembly will be wall mounted at the front of the room facing the rear.

Room lighting must be upgraded to appropriate levels and color temperature that is suitable for video broadcast cameras.

Presentation Rooms

The selected rooms to be upgraded for In-Room Projection of Network Accessed Information and related Media should be reviewed for acoustical performance and for lighting quality.

Acoustical modifications of the room may be necessary in order to provide a suitable environment for A/V presentations.

Should these rooms be selected for future broadcast origination, room lighting must be upgraded to appropriate levels and color temperature that is suitable for video broadcast cameras.

Electrical and Mechanical Service Requirements

Cable Conveyance Systems

Fiber optic lines are to be run between the Video Headend and the local cable provider's building entry.

RG-11 coaxial riser cable shall be run from the Video Headend to distribution closets on each floor.

Horizontal distribution will be run from each floor's distribution closet to designated areas via home runs to each distribution closet.

Horizontal distribution will also be run to each Multi-Media outlet along side the Voice and Data compliment as discussed in 3.0.

Baseband Video and Audio and control lines shall be run from the Senate and House Chambers to the Video Headend as well as from the designated Presentation Rooms and any other rooms identified as potential broadcast origination points.

Conduit shall be run from an outdoor weatherproof interface panel near where the Network and

Television Crews may park to a central pull box located in the basement. Conduit shall be run from the central pull box to the room(s) occupied by the Media and to the roof access port for future microwave and tie cables.

Presentation rooms shall have low voltage cabling from several strategically placed flush-mount floor boxes to a wall panel for connection to the multi-media and A/V equipment located in custom millwork. These floor boxes are primarily for connection of laptop computers to the A/V equipment however, the boxes specified can accommodate Voice, Data, and Power.

Presentation rooms shall have cables run for projectors, speakers, shade controllers, lighting controllers, and for electrically operable projection screens each home run to the A/V interface panel for the equipment located in custom millwork.

Power

Power shall be provided in floor boxes in Presentation Rooms to service the laptops and similar equipment.

A minimum of two (2) 20 amp circuits shall be provided in each Presentation room specifically to power A/V equipment.

Shore power shall be provided at the same outdoor panel located for the Media Pool Trucks that provides Video, Intercom, and Audio tie lines to the basement pull box.

All outlets to power A/V equipment shall be isolated ground type with a separate ground path to the main technical ground panel.

General Equipment Specifications

See Attached Spreadsheet.

General Equipment Budget

See Attached Spreadsheet.

Appendices

We have appended reference literature associated with the range of Wireless LAN products currently available, and specifically those products recommended within the body of this report.

A/V Equipment - Montana State Renovation
Equipment Schedule

Project: Montana Capitol A/V Renovation
Proj. No.: 98013
Subject: A/V Equipment
Date: 02.26.98
File Code: 98\98013\equip1.xls

Qty.	Manufacturer/ Model No.	Description	Use	List Price	Total Cost	Power (W)	Total Power (W)	Amps (Calc'ed)	Amps (w/D.F.)	BTU (Calc'ed)	BTU (w/D.F.)	Weight
Equipment Needed for Video Headend												
												0.00
15	S/A 9270 Frequency Agile Modulator	Television Modulator	Provide television signal	$1,281.00	$19,215.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	T.B.D.	Character Generator	Banner Generator	$8,000.00	$8,000.00							
7	Sony ST-92TV	Frequency Agile Demodulator (Monitoring)	TCI Demod video/music	$535.00	$3,745.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	GVG SCB-100N	Sync Gen. Bars, Black, Tone	Sync Generator	$1,295.00	$1,295.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Blonder CRT-20	20db tap		$4.92	$34.44							0.00
2	Blonder OC-8	8-way Combiner	8-way Combiner	$255.39	$510.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	Blonder RMDA 750-30P	Amplifier	Launch Amp	$1,063.00	$1,063.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	GVG 10XL	Source Selector	Source Selector	$1,595.00	$4,785.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	VAC VS-3 Video Squelch	Provides auto changeover	Provides auto changeover	$995.00	$2,985.00							
3	VAC VDA-640	Video D/A	Distribution	$249.00	$747.00							
Headend Monitoring												
1	Sony ST-92TV	Frequency Agile Demodulator (Monitoring)	Monitor Video Signal	$535.00	$535.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	Wohler AMP-2	Self Powered Speakers	Monitor Audio Signal	$1,095.00	$1,095.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	Sony PVM-20N1U	Headend Video Monitor	20" monitor	$1,500.00	$1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	Wavetek CLI-1750	Signal Level Meter	Verify Signal Quality	$1,750.00	$1,750.00							
Copper Horizontal Distribution Equipment (always needed)												
4	Blonder BIDA 750-30	Distr. Amp	Bidirectional amp	$925.11	$3,700.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Blonder BIDA FA	Fixed Attenuator	Bidirectional amp	$11.23	$44.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Blonder BIDA -CE-7	Equalizer	Bidirectional amp	$22.46	$89.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Blonder BIDA-RA	Return amplifier	Bidirectional amp	$154.29	$617.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Blonder XRS-2	2 out 20 db tap	Provide signal splitting	$11.48	$91.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Toner XQT-48	48-out tap	Provide signal splitting	$200.00	$800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	Blonder CVS-8	8 out splitter, vertical	Provide signal splitting	$11.48	$11.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	Blonder DSV	Band Splitter	Combine Fwd w/Rev signals	$74.90	$74.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Headend Fiber Equipment (tie to/from local cable co.)												
1	BNI TR2100-7709-750-ST	Fiber Transmitter	Connect broadband copper to fiber to IDC on each floor	$11,500.00	$11,500.00	35.00	35.00	0.29	0.20	119.57	82.50	82.50
1	BNI TR2200-750(38)R	Fiber Receiver	Convert Broadband fiber to Copper on each floor	$1,850.00	$1,850.00	10.00	10.00	0.08	0.06	34.16	23.57	23.57

Misc. Headend Equipment												
2	ADC PPB3-14 MKII HN	Audio Patch Bay (half	Audio Patch Bay	$1,177.00	$2,354.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	ADC PPI2226RS-N	Video Patch Bay	Video Signal Patching	$1,071.00	$3,213.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	ADC BK3B	3' Single Bantam Patch Audio	Audio Signal Patching	$23.61	$283.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	ADC BK3V	3' Video Patch Cords-Black	Video Signal Patching	$19.66	$235.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Clear-Com CC-85	Single Muff Headset	Intercom Headset	$175.00	$700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Clear-Com KB-112	Wall Speaker Station w/mic	Intercom	$312.00	$624.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Clear-Com MR-102A	Wall Headset Station	Intercom	$227.00	$908.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	Clear-Com MS-400A	Main Station	Intercom Main Station	$1,228.00	$1,228.00	25.00	25.00	0.21	0.14	85.41	58.93	0.00
3	Clear-Com RS-502	Belt-pack	Intercom Module	$299.00	$897.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	Mackie 1402-VLZ	Mixer	Audio	$599.00	$599.00	20.00	20.00	0.17	0.12	68.32	47.14	0.00
1	Panasonic PV-S7670	S-VHS Deck	S-VHS Player	$449.95	$449.95	50.00	50.00	0.42	0.29	170.81	117.86	
1	Panasonic WJ-MX50	Digital A/V Mixer	Switcher	$6,570.00	$6,570.00	55.00	55.00	0.46	0.32	187.89	129.64	15.00
1	BNI TR2100-7709-750-ST	Fiber Transmitter	Connect broadband copper	$11,500.00	$11,500.00	35.00	35.00	0.29	0.20	119.57	82.50	82.50
4	Winstead V8691	Rack Cabinet 45U	Equipment Housing	$1,052.00	$4,208.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	Blonder CRT-20	20db tap	Reverse Test point	$4.92	$4.92							
												0.00

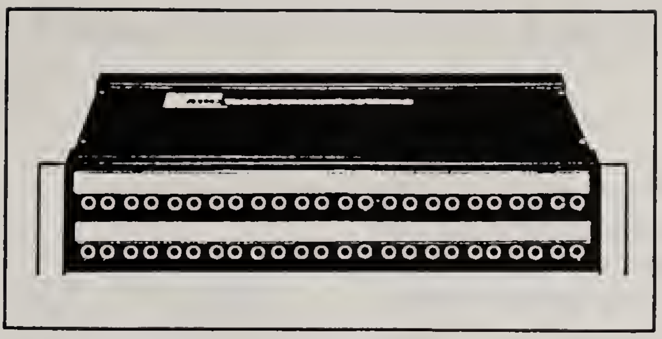
Equipment Totals	$99,815.91	Totals	$230.00	$1.92	$1.32	$785.73	$542.15	$203.57
Contingency @20%	$19,963.18						
Tax @ 8.25%	$9,881.78						
Estimated Installation (20%)	$23,955.82						
Grand Total	$153,616.69						

Equipment to Upgrade Senate and House Chambers for Broadcast Origination							THERMAL AND POWER CALCS					
Qty.	Manufacturer/ Model No.	Description	Use	List Price	Total Cost	Power	Total Power (W)	Amps (Calc'ed)	Amps (w/D.F.)	BTU (Calc'ed)	BTU (w/D.F.)	Weight
4	Parkervision CPT-2017-A3N	Manual Camera System w/17:1 Lens	Video Source	$22,995.00	$91,980.00	25.00	100.00	0.83	0.58	341.62	235.72	12.00
1	Parkervision JSC-2000	Shot Director Camera Controller	Video Source	$2,995.00	$2,995.00	25.00	25.00	0.21	0.14	85.41	58.93	12.00
2	Shure SCM 810	Microphone Mixer	Audio Processing	$1,650.00	$3,300.00	20.00	40.00	0.33	0.23	136.65	94.29	10.00
4	Peerless CMR401	Camera Mount	Camera Mount	$75.00	$300.00	0.00	0.00	0.00	0.00	0.00	0.00	212.00
Equipment Totals					**$98,575.00**	**Totals**	**165.00**	**1.38**	**0.95**	**563.67**	**388.93**	**246.00**
Contingency @20%					**$19,715.00**							
Tax @ 8.25%					**$9,758.93**							
Estimated Installation (20%)					**$23,658.00**							
Grand Total					**$151,706.93**							

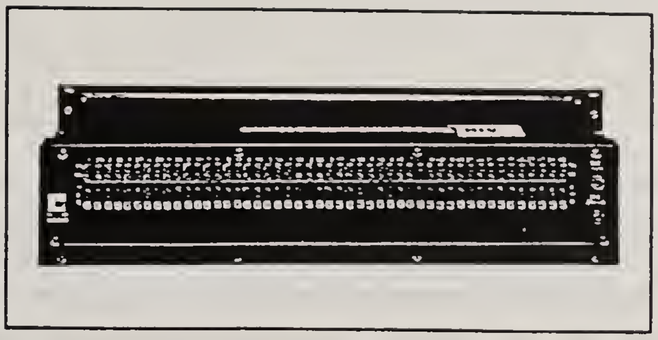
Equipment needed to upgrade two (2) Presentation Rooms (assuming 1 projection screen in each room)						THERMAL AND POWER CALCS						
Qty.	Manufacturer/ Model No.	Description	Use	List Price	Total Cost	Power	Total Power (W)	Amps (Calc'ed)	Amps (w/D.F.)	BTU (Calc'ed)	BTU (w/D.F.)	Weight
2	Bryston 3B	Audio Amplifier	Amplifier For Audio System	$1,565.00	$3,130.00	200.00	400.00	3.33	2.30	1366.48	942.87	28.00
4	Crestron CNIRP	IR Emitter Probe	VCR & DVD control	$38.00	$152.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Crestron CNMS	16 Rly, 6 IR,8 I/O,2x2W RS232	Crestron control system	$1,800.00	$3,600.00	20.00	40.00	0.33	0.23	136.65	94.29	35.00
2	Crestron CNRFGWA	Wireless Screen Receiver	Crestron control system	$375.00	$750.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
4	Crestron CNSP-XX	Custom Serial Interface	Extron Control	$113.00	$452.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Crestron CNVCP-2	Module Line Lvl Volume 2 channel	Main Volume Control	$350.00	$700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Crestron Programing	Crestron System Setup	Crestron control system	$3,000.00	$18,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Crestron ST-1500C	Wireless Color Touchscreen	System Control	$1,950.00	$3,900.00	5.00	10.00	0.08	0.06	34.16	23.57	5.00
2	Crestron STBC	Touchscreen Charger	System Control	$375.00	$750.00	5.00	10.00	0.08	0.06	34.16	23.57	5.00
2	Extron 2U Rack Shelf 60-	ADA 2U Rack Shelf	Mounting Hardware	$125.00	$250.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Extron 2U Rack Shelf 60-	Front Panel	Mounting Hardware	$125.00	$250.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Extron 4LDex	Line Doubler	Projector Source Selection	$4,295.00	$8,590.00	30.00	60.00	0.50	0.35	204.97	141.43	21.00
2	Extron RGB 120	Universal Computer Interface	Interface For Computer	$695.00	$1,390.00	10.00	20.00	0.17	0.12	68.32	47.14	4.00
2	NEC MT1000	LCD Video Projector	Video Media Presentation	$9,000.00	$18,000.00	350.00	700.00	5.83	4.03	2391.34	1650.02	122.00
2	NEC MT1000 Ceiling	LCD Video Projector	Video Media Presentation	$150.00	$300.00	0.00	0.00	0.00	0.00	0.00	0.00	122.00
2	Elmo EV-368 Visual	Visual Presenter	Overhead Video Display	$4,040.00	$8,080.00	15.00	30.00	0.25	0.17	102.49	70.72	0.00
2	Panasonic PV-S4670	S-VHS Deck	S-VHS Player	$499.00	$998.00	20.00	40.00	0.33	0.23	136.65	94.29	12.00
2	Rane GE14	Equalizer	Playback Equalizer	$569.00	$1,138.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Da-Lite Boardroom Electrol 60"x80"	Projection Screen	A/V	$1,589.00	$3,178.00	156.00	312.00	2.60	1.79	1065.85	735.44	89.00
2	Tannoy 12 DMTII (pair)	Speakers	Main Speakers	$2,745.00	$5,490.00	0.00	0.00	0.00	0.00	0.00	0.00	82.00
2	Winstead V8408	Rack Cabinet 20U	Equipment Housing	$725.00	$1,450.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment Totals					$80,548.00	Totals	1622.00	13.52	9.33	5541.08	3823.34	530.00
Contingency @20%					$16,109.60							
Tax @ 8.25%					$7,974.25							
Estimated Installation (20%)					$19,331.52							
Grand Total					$123,963.37							

Summary Totals	
Equipment Needed for Video Headend	$153,616.69
Equipment to Upgrade Senate and House Chambers for Broadcast Origination	$151,706.93
Equipment needed to upgrade two (2) Presentation Rooms (assuming 1 projection screen in each room)	$123,963.37
Grand Total	**$429,286.98**

Stereo Pro Patch



PPS3-14MKIINO (Front)



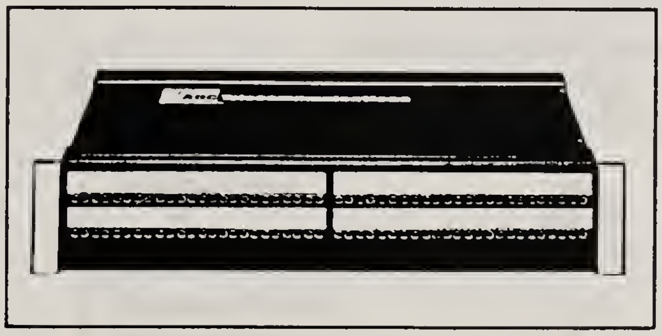
PPS3-14MKIINO (Rear)

Ordering Information

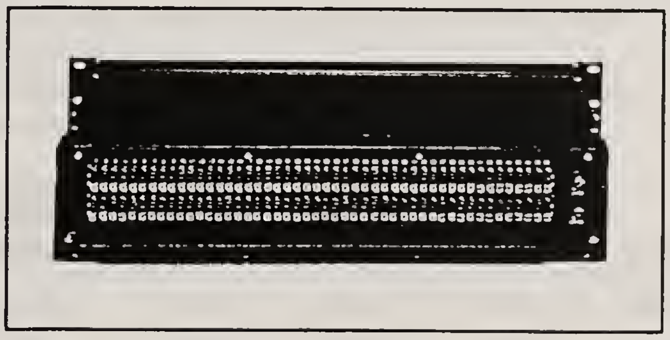
Description	Catalog Number
Stereo Pro Patch 19" (48.26 cm) rack mount, 3.5" H (8.89 cm), 2 x 24 array of Longframe (.25"; .64 cm) jacks; jacks grouped in horizontal pairs (.625", .700", .625", . . .[1.59, 1.78, 1.59 cm])	
Normals Out	
14" (35.56 cm) deep	PPS3-14MKIINO
18" (45.72 cm) deep	PPS3-18MKIINO
Normals Strapped (Fully Normalled)	
14" (35.56 cm) deep	PPS3-14MKIINS
18" (45.72 cm) deep	PPS3-18MKIINS
Half Normalled	
14" (35.56 cm) deep	PPS3-14MKIIHN
18" (45.72 cm) deep	PPS3-18MKIIHN

See drawings on page 83, Figure 3, 7 and 8, and page 84, Figures 9 and 10.

Bantam Pro Patch



PPB3-14MKIINS (Front)



PPB3-14MKIINS (Rear)

Ordering Information

Description	Catalog Number
Bantam Pro Patch (.173"; .44 cm) 19" (48.26 cm) rack mount, with Bantam jacks; jacks grouped in horizontal pairs (.312", .370", .312"... [.79, .94, .79 cm])	
Normals Strapped (Fully Normalled), 3.5" H, 14" D (8.89 x 35.56 cm), 2 x 48 rows	PPB3-14MKIINS
Half Normalled, 3.5" H x 14" D (8.89 x 35.56 cm), 2 x 48 rows	PPB3-14MKIIHN
No Normals, 1.75" H x 14" D (4.45 x 35.56 cm), 1 x 48 rows	PPB1-14MKIINN

NOTE: Bantam Pro Patch with normals brought out is not available; see Bantam BJF series, page 39. Ground posts provided for optional customer wiring.

See drawings on page 83, Figures 5, 6 and 8, and page 84, Figures 12 and 13.

Broadband Indoor Distribution Amplifiers BIDA Series

ORDERING INFORMATION:

AMPLIFIERS Ⓤ︀Ⓛ WITH OPTIONAL RETURN FILTER

BIDA 450-30
Stock No. 5400-43

BIDA 450-50
Stock No. 5400-45

BIDA 550-30
Stock No. 5400-53

BIDA 550-50
Stock No. 5400-55

BIDA 750-30
Stock No. 5400-73

EQUALIZERS

BIDA-CE-4 (450 MHz)
Stock No. 5474 (4)

BIDA-CE-5 (550 MHz)
Stock No. 5475 (4)

BIDA-CE-7 (750 MHz)
Stock No. 5477 (4)

BIDA-CE-8 (860 MHz)
Stock No. 5478 (4)

ATTENUATORS

BIDA-FA
Stock No. 5411 (4)

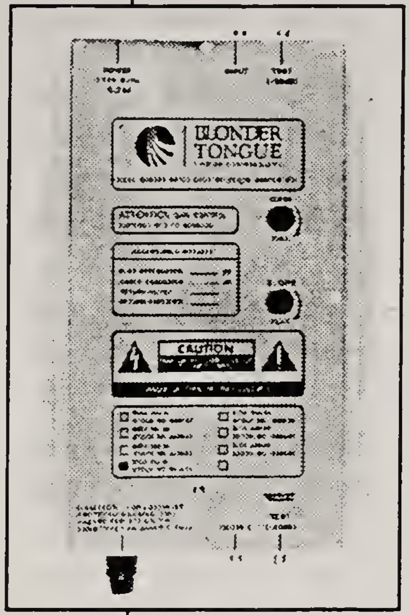
RETURN AMPS & FILTERS

BIDA-RA (Return Amp)
Stock No. 5402

BIDA-RF (Return Filter)
Stock No. 54071

BIDA 5400 FEATURES:

- Several Models Available - 30 or 50 dB Gain, 450, 550, 750, and 860 MHz
- Dual Push-Pull Hybrid Modules for High Output with Low Distortion
- Passive (With Optional or Integrated Return Filters) and Active Two-Way Capability
- Built-in Variable Gain and Slope Controls Input and Output Test Ports Allow Signal Testing without Interruption of Service
- Attenuator and Cable Equalization Options Available .
- Exceptional Temperature Stability
- Line Transient Protection
- Aluminum Chassis Provides Excellent Heat Dissipation



The BIDA Series includes professional quality, broadband, two-way capable, indoor hybrid distribution amplifiers. These amplifiers are designed for RF distribution systems, such as apartment complexes, hospitals, schools, prisons, hotels, and a wide variety of similar applications. The product family has grown significantly in response to customer applications and available hybrid technology. The BIDA Series is ideal for multi-channel RF distribution systems whose input source is a "cable drop" or the output of a MATV/SMATV/CATV headend. Additionally, the BIDA Series may be used as the launch amplifier in a distribution network.

PRODUCT SIMILARITIES:

These amplifiers use dual push-pull hybrid modules, capable of delivering high output levels with low distortion, even in systems with over 100 channels of programming. The gain and slope controls are designed between the hybrid modules for optimum noise figure, input return loss and output capability. Test ports for both the input and output are provided for testing signal levels without interrupting service. The BIDA Series come in a rugged, aluminum chassis that provides exceptional heat dissipation. This allows the BIDA Series to be operated at high ambient temperatures with no degradation of performance or reliability. The combination of features and durable construction ensures that the BIDA Series will provide years of reliable, trouble-free service.

PRODUCT SPECIFIC FEATURES:

GAIN:	Forward gains of either 32 dB, 44 or 50 dB
POWER:	Hybrid push-pull or hybrid power doubling models are stocked
BANDWIDTH:	Forward bandwidths of 450 MHz, 550 MHz, 750 MHz, & 860 MHz
RETURN PATH:	Models 5400-xx provide an optional return filter module. Models 5700-xx are shipped with integrated return filters. Models 5800-xx include on board active return amplifiers.
SLOPE CONTROL:	Model 5400-xx and 5700-xx contain a continuous 10 dB control with optional plug-in equalizers in 6, 12 & 18 dB values. Models 5800-xx feature equalizers in 3,6,9,12,15 & 18 dB values and a continuous 6 dB slope control.
ATTENUATION CONTROL:	Model 5400-xx contain a continuous 15 dB adjustment. Attenuator pads are available in 6, 12 or 18 dB values. Model 5700-xx contain a continuous 10 dB control with available pads of 6, 12, or 18 dB.Model 5800-xx features pads in one dB increments from 1 to 20 dB. The level control has an 8 dB adjustment range.
POWER:	Model 5400-xx contains an internal 120 VAC input power supply. Models 5700 and 5800 feature an external power transformer that provides a 26 VAC input to the amplifier.

SPECIFICATIONS ***RF***	***BIDA 450-30 #5400-43***	***BIDA 450-50 #5400-45***	***BIDA 550-30 #5400-53***	***BIDA 550-50 #5400-55***	***BIDA 750-30 #5400-73***	***Units***
Frequency Range:	47-450	47-450	47-550	47-550	47-750	MHz
Channel Loading:	60	60	77	77	110	
Flatness:	±0.75	±0.75	±0.75	±0.75	±1.00	dB
Gain:	33	50	33	50	31	dB
Noise Figure (a):	6.0	6.0	7.0	7.0	9.0	dB
Output Level:	+46	+46	+44	+44	+44	dBmV
Test Port Level						
Input:	-30, ±2	-30, ±2	-30, ±2	-30, ±2	-30, ±2	dB
Output:	-30, ±2	-30, ±2	-30, ±2	-30, ±2	-30, ±2	dB
Gain Control Range:	15	15	15	15	15	dB
Slope Control Range:	10	10	10	10	10	dB
Composite Triple Beat - CTB (b):	-60	-59	-58	-58	-54	dB
Cross Modulation - XMOD (b):	-60	-60	-61	-61	-58	dB
Composite Second Order - CSO (b):	-60	-59	-58	-58	-55	dB
Hum Modulation:	-70	-70	-70	-70	-70	dB
Number Of Hybrids:	2	2	2	2	2	
Hybrid Technology:	Push-Pull	Push-Pull	Push-Pull	Push-Pull	Push-Pull	
Impedance - All Ports:	75	75	75	75	75	Ω
Return Loss						
Input:	14	14	14	14	13	dB
Output:	14	14	14	14	13	dB

Ordering Notes: (1) Specify desired frequency. (2) Specify desired channel(s). (3) Specify desired option. (4) Specify desired isolation value or tap value.

RF	*BIDA 45R-30 #5700-43*	*BIDA 45R-50 #5700-45*	*BIDA 55R-30 #5700-53*	*BIDA 55R-50 #5700-55*	*BIDA 75R-30 #5700-73*	*BIDA 86R-30 #5700-83*	*Units*
Frequency Range:	5-30	5-30	5-30	5-30	5-30	5-30	MHz
	47-450	47-450	47-550	47-550	47-750	47-860	MHz
Channel Loading:	60	60	77	77	110	129	
Flatness:	±0.75	±0.75	±0.75	±0.75	±0.75	±0.75	dB
Gain:	32	50	32	50	32	32	dB
Noise Figure (a):	6.0	6.0	7.0	7.0	9.0	9.0	dB
Output Level:	+46	+46	+44	+44	+44	+40	dBmV
Test Port Level							
Input:	-30, ±2	-30, ±2	-30, ±2	-30, ±2	-30, ±2	-30, ±2	dB
Output:	-30, ±2	-30, ±2	-30, ±2	-30, ±2	-30, ±2	-30, ±2	dB
Gain Control Range:	10	10	10	10	10	10	dB
Slope Control Range:	10	10	10	10	10	10	dB
Composite Triple Beat - CTB (b):	-60	-60	-58	-58	-54	-54	dB
Cross Modulation - XMOD (b):	-61	-61	-61	-61	-58	-60	dB
Composite Second Order - CSO (b):	-60	-60	-58	-58	-55	-54	dB
Hum Modulation:	-70	-70	-70	-70	-70	-70	dB
Number Of Hybrids:	2	2	2	2	2	2	
Hybrid Technology:	Push-Pull	Push-Pull	Push-Pull	Push-Pull	Push-Pull	Push-Pull	
Impedance - All Ports:	75	75	75	75	75	75	Ω
Return Loss							
Input:	18	18	18	18	18	18	dB
Output:	18	18	18	18	18	18	dB

SEE FOLLOWING PAGE FOR BIDA-RA AND BIDA-RF COMMON SPECIFICATIONS

COMMON SPECIFICATION

GENERAL	*BIDA*	*Units*
Power Requirements		
Voltage:	117, ±10%	VAC
Frequency:	60	Hz
Power (h):	19 to 21	W
Fuse:	3/8	A
Temperature Range:	-20 to +60	°C
MECHANICAL		
Dimensions (WxHxD):	7.13 x 11.50 x 2.68	in
	181 x 292 x 68	mm
Weight:	5.75 lb (2.61 kg)	

CONNECTORS (Side Panel)	
RF Input:	Type "F", female
RF Output:	Type "F", female

INDICATORS (Side Panel)	*Units*
Power ON:	LED, red

CONTROLS (Top Panel)	
Gain:	Control
Slope:	Control

CONNECTORS (Side Panel)	
Input Test Port:	Type "F", female
Output Test Port:	Type "F", female

ACCESSORIES (OPTIONAL PLUG-INS FOR AMPLIFIERS)

ALL AMPLIFIERS

Fixed Attenuators (6, 12, or 18 dB)
Cable Equalizers (6, 12, or 18 dB)
Return Amplifiers (5 to 30 MHz)

AMPLIFIERS WITH OPTIONAL RETURN FILTER ONLY

Return Filters - 2 Per Package (5 to 30 MHz)

Ordering Notes: (1) Specify desired frequency. (2) Specify desired channel(s). (3) Specify desired option. (4) Specify desired isolation value or tap value.

ORDERING INFORMATION:

AMPLIFIERS WITH UL INTEGRATED RETURN FILTER

BIDA 45R-30
Stock No. 5700-43

BIDA 45R-50
Stock No. 5700-45

BIDA 55R-30
Stock No. 5700-53

BIDA 55R-50
Stock No. 5700-55

BIDA 75R-30
Stock No. 5700-73

BIDA-86R-30
Stock No. 5700-83

BIDA 5700 FEATURES:

- Integrated Passive Return
- Frequency Models 450, 550, 750, 860 MHz
- Gain Models 32 and 50 dB

NOTES:

Specification charts represent overall performance between the BIDA amplifier's input and output ports with no optional field installed modules.

One-way and two-way integrated standard amplifier models are shipped with a 0 dB attenuator and a 0 dB cable equalizer.

(a) measured at full gain with 0 dB slope
(b) at specified channel loading at rated output capability
(c) two-way configuration represent basic amplifier with field installed sub-channel passive filters or active return amplifier
(d) measured with output set at +42 dBmV with three channel loading
(e) BIDA-RF is used with the 5400 Series
(f) measured with output set at +48 dBmV (channels 2 and 13)
(g) measured with output set at +48 dBmV (channels T7 and T8)
(h) depends on model selected

C10-1 Passive Combiners OC Series

The OC Series includes professional quality, passive output combiners. These units are designed for use in headends to combine the outputs of multiple modulators and processors. The OC Series employs radiation-proof passive components that provide excellent signal reproduction and years of reliable service. Four models are available, including: OC-8d, 8 inputs; OC-12d, 12 input, OC-12f, 12 inputs, band filtered; and OC-16, 16 inputs.

The OC-8d, OC-12d and OC-16 feature high isolation between ports and a low net combining loss from each of the broadband inputs (5 to 1000 MHz). The OC-12f provides frequency selective band filtering on the combiner inputs. The twelve ports are arranged into four groups of three inputs each. Any one of the three inputs of a particular group will pass a specified RF bandwidth of three adjacent channels (18 MHz). The OC-12f is recommended for reducing spurious responses, noise, and intermodulation products that may occur in large headends. Additionally, the combiner will greatly reduce the effects due to a malfunction in any one modulator or processor. The OC-12f is available in five band configurations, each containing twelve channels. These are designated as B1 (2-6, 7-12, and broadband input), B2 (14-22, 13, 23-24), B3 (25-36), B4 (37-48), and B5 (49-60). Special channel configurations are also available. Consult Blonder Tongue factory for more information.

The OC Series products are housed in a single height, 1.75" high, rack mountable, aluminum chassis. A 20 dB test port is provided for signal monitoring without disrupting service.

SPECIFICATIONS RF	***OC-8d #5957***	***OC-12d #5953***	***OC-12f #5955***	***OC-16 #5950***	***Units***
Number of Inputs:	8	12	12	16	
Frequency Range:	5-1000	5-1000	50-450	50-1000	MHz
Flatness - Relative to Slope:	±0.20	±0.20	±0.50	±0.50	dB
Slope:	1.50	1.50	0.75	1.0	dB
Insertion Loss - Individual Port					
40 to 450 MHz:	11	20	16	24	dB
450 to 1000 MHz:	14	22	16	26	dB
Isolation - Between Adjacent Ports					
40 to 450 MHz:	32	38	35	35	dB
450 to 1000 MHz:	32	38	NA	32	dB
Isolation - Between Any Ports					
40 to 1000 MHz:	42	65	NA	65	dB
Selectivity:	NA	NA	3 (a) 20 (b)	NA	dB
Test Port Level:	-20	-20	-20	-20	dB
Impedance - All Ports:	75	75	75	75	Ω
Input Return Loss					
40 to 450 MHz:	30	20	20	20	dB
450 to 1000 MHz:	30	20	NA	20	dB
Output Return Loss					
40 to 450 MHz:	19	16	12	16	dB
450 to 1000 MHz:	19	16	NA		dB
MECHANICAL					
Dimensions (WxHxD):	19.0 x 1.75 x 15.25 483 x 44 x 387	19.0 x 1.75 x 15.25 483 x 44 x 387	19.0 x 1.75 x 15.25 483 x 44 x 387	19.0 x 3.50 x 15.25 483 x 44 x 387	in. mm
Weight:	6.5 2.95	7.0 3.18	7.0 3.18	10.5 4.77	lbs. kg
CONNECTORS (Rear Panel)					
RF Input:	"F" type, female	"F" type female	"F" type female	"F" type female	
RF Outputs:	"F" type female	"F" type female	"F" type female	"F" type female	
CONNECTORS (Front Panel)					
Test Port:	"F" type female	"F" type female	"F" type female	"F" type female	

Ordering Notes: (1) Specify desired frequency. (2) Specify desired channel(s) or band(s). (3) Specify desired option. (4) Specify desired isolation value or tap value.

ORDERING INFORMATION:

OC-8d
Stock No. 5957

OC-12d
Stock No. 5953

OC-12f
Stock No. 5955 (2)

Bands Available for OC-12f:

B1:	(2,3,4), (5,6,BB), (7,8,9), (10,11,12)
B2	(14,15,16), (17,18,19), (20,21,22), (13,23,24)
B3:	(25,26,27), (28,29,30), (31,32,33), (34,35,36)
B4:	(37,38,39), (40,41,42), (43,44,45), (46,47,48)
B5:	(49,50,51), (52,53,54), (55,56,57), (58,59,60)

OC-16
Stock No. 5950

FEATURES:

- 8, 12 or 16 Inputs
- Available With Band Filtering (OC-12f Only)
- High Isolation, Low Net Combining Loss
- 20 dB Test Port
- Rack Mount - 1 EIA (1.75") Spacing, Rugged Aluminum Chassis

NOTES

(a) 30 MHz BW
(b) 85 MHz BW

Toll Free For Ordering!
800-523-6049
FAX 800-336-6295

Indoor Directional Couplers & Tapoffs DCW, CRT, CRL, & STB Series

INDOOR DIRECTIONAL TAPS FEATURES

DCW SERIES

- Performance to 1000 MHz
- 1 Way Directional Tap, L Style
- Die Cast Housing
- RF Shielding

CRT SERIES

- Superior Performance to 750 MHz
- 1, 2, and 4 Way Models
- In-Line and L Style Models
- RF Shielding

CRL SERIES

- Superior Performance to 1000 MHz
- 1 Way Resistive Tap, In-Line Style
- Power Passing
- Die Cast Housing
- RF Shielding

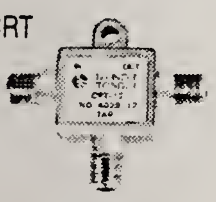
STB SERIES

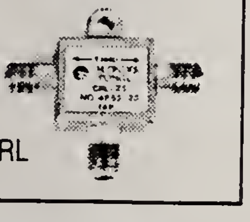
- Superior Performance to 890 MHz
- 2 and 4 Way Models
- Made in the USA

LOW COST TAPS

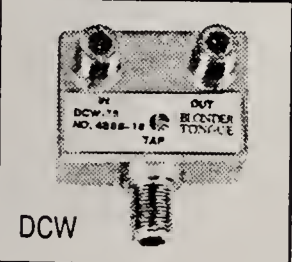
- See page E10-1 for additional selections.

CRT





CRL



DCW

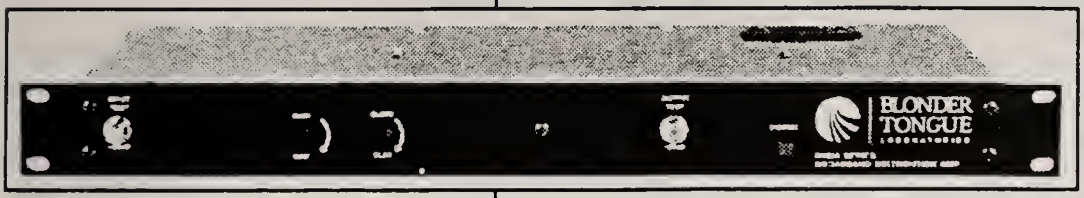
Product Specifications

Model	Stock No.	Tap Value (dB)	No. of Outputs	Frequency Range (MHz)	Isolation Tap to Tap (dB)	Isolation Output to Tap (dB)	
						5 - 470 (MHz)	470 - 1000 (MHz)
DCW	4889-4	4	1	5 to 1000	N/A	20	18
	4889-6	6				22	20
	4889-9	9				24	20
	4889-12	12				30	24
	4889-16	16				30	26
	4889-20	20				36	30
	4889-24	24				36	30
	4889-27	27				40	30
	4889-30	30				40	30
						5 - 400 (MHz)	400 - 1000 (MHz)
CRT	4029-4	4	1	5 to 1000	N/A	20	18
	4029-6	6				22	20
	4029-9	9				24	20
	4029-12	12				30	24
	4029-16	16				30	26
	4029-20	20				36	30
	4029-24	24				36	30
	4029-27	27				40	30
	4029-30	30				40	30
CRT-2A	4062-4	4	2	5 to 750	27 (10-400 MHz) 25 (400-550 MHz) 20 (5-10 & 550-750 MHz)	Terminated	
	4062-8	8				22 (5-400); 20 (400-500); 17 (500-750) (MHz)	
	4062-11	11				25 (5-400); 23 (400-500); 21 (500-750) (MHz)	
	4062-14	14				28 (5-400); 25 (400-500); 22 (500-750) (MHz)	
	4062-17	17				31 (5-400); 28 (400-500); 25 (500-750) (MHz)	
	4062-20	20				35 (5-400); 32 (400-500); 29 (500-750) (MHz)	
	4062-23	23				36 (5-400); 35 (400-500); 33 (500-750) (MHz)	
	4062-26	26				39 (5-400); 39 (400-500); 33 (500-750) (MHz)	
	4062-29	29				42 (5-400); 42 (400-500); 39 (500-750) (MHz)	
	4062-32	32				42 (5-400); 45 (400-500); 42 (500-750) (MHz)	
CRT-4A	4064-8	8	4	5 to 750	27 (10-550 MHz) 20 (5-10 & 550-750 MHz)	Terminated	
	4062-11	11				24 (5-400); 24 (400-500); 21 (500-750) (MHz)	
	4062-14	14				27 (5-400); 25 (400-500); 21 (500-750) (MHz)	
	4062-17	17				31 (5-400); 26 (400-500); 23 (500-750) (MHz)	
	4062-20	20				33 (5-400); 31 (400-500); 27 (500-750) (MHz)	
	4062-23	23				37 (5-400); 34 (400-500); 29 (500-750) (MHz)	
	4062-26	26				39 (5-400); 37 (400-500); 31 (500-750) (MHz)	
	4062-29	29				42 (5-400); 40 (400-500); 35 (500-750) (MHz)	
	4062-32	32				44 (5-400); 42 (400-500); 38 (500-750) (MHz)	
	4062-35	35				46 (5-400); 45 (400-500); 40 (500-750) (MHz)	
CRL	4652-7	7	1	5 to 1000	Resistive Tapoffs	Resistive Tapoffs	
	4652-12	12					
	4652-17	17					
	4652-23	23					
STB-2/20	4612	20	2	12-890	35 (Sub), 36 (VHF & UHF)	20 (Sub, 25 (VHF & UHF)	
STB-4/20	4613	20	4	12-890	31 (Sub & VHF), 34 (UHF)	21 (Sub, 25 (VHF & UHF)	

Ordering Notes: (1) Specify desired frequency. (2) Specify desired channel(s). (3) Specify desired option. (4) Specify desired isolation value or tap value.

E1-1

Rack Mounted Distribution Amplifiers RMDA Series



The RMDA Series includes professional quality, broadband, rack mounted hybrid distribution amplifiers. These amplifiers are designed for RF distribution systems, such as apartment complexes, hospitals, schools, prisons, hotels, and a wide variety of similar applications. The RMDA Series is ideal for those RF distribution systems whose input source is the output of a MATV/SMATV/CATV headend. Eleven models are available, including units with 15, 30 or 50 dB gain and frequency ranges from 40 to 450, 550 or 750 MHz.

The RMDA Series amplifiers have flat 15, 30, or 50 dB operational gain, which is variable using a built-in gain control. Variable slope control is also provided, with an available range of 10 dB. These amplifiers use either single push-pull, dual push-pull or dual power doubling hybrid modules, capable of delivering high output levels with low distortion, even in system with 110 channels of programming. Backmatched test ports for both the input and output are provided for testing signal levels without interrupting service (not available in the single gain models).

The RMDA Series products are housed in a single height, 1.75" high, rack mountable, aluminum chassis that provides exceptional heat dissipation. This allows the RMDA Series to be operated at high ambient temperatures with no degradation of performance or reliability. Durable construction ensures that the RMDA Series will provide years of reliable, trouble-free service. Full slope and gain controls, as well as input and output test ports, are available from the front panel of the unit.

FEATURES:

- Several Models Available - 15, 30 or 50 dB Gain; 450, 550, or 750 MHz
- Single Push-Pull, Dual Push-Pull, or Dual Power Doubling Hybrid Modules for High Output with Low Distortion
- Built-in Variable Gain and Slope Controls
- Input and Output Test Ports Allow Signal Testing without Interruption of Service (Except Single Hybrid Models)
- Exceptional Temperature Stability
- Line Transient Protection
- Front Panel Access to all Controls
- Rack Mount - 1 EIA (1.75") Spacing, Rugged Aluminum Chassis Provides Excellent Heat Dissipation

SPECIFICATIONS RF	*RMDA 450-30S #5500S-43*	*RMDA 450-30 #5500-43*	*RMDA 450-30P #5500P-43*	*RMDA 450-50 #5500-45*	*Units*
Frequency Range:	47-450	47-450	47-450	47-450	MHz
Channel Loading:	60	60	60	60	
Flatness:	±0.75	±0.75	±0.75	±0.75	dB
Gain:	33	33	33	50	dB
Noise Figure (a):	7.5	6.0	6.0	6.0	dB
Output Level:	+46 (b)	+46 (b)	+46 (b)	+46 (b)	dBmV
Test Port Level					
Input:	NA	-20, ±2	-20, ±2	-20, ±2	dB
Output:	NA	-20, ±2	-20, ±2	-20, ±2	dB
Gain Control Range:	15	15	15	15	dB
Slope Control Range:	10	10	10	10	dB
Composite Triple Beat - CTB (b):	-60	-60	-66	-60	dB
Cross Modulation - XMOD (b):	-61	-61	-68	-61	dB
Composite Second Order - CSO (b):	-60	-60	-67	-60	dB
Hum Modulation:	-70	-70	-70	-70	dB
Number of Hybrids:	1	2	2	2	
Hybrid Technology:	Push-Pull	Push-Pull	Power Doubling	Push-Pull	
Impedance - All Ports:	75	75	75	75	Ω
Return Loss					
Input:	14	14	14	14	dB
Output:	14	14	14	14	dB

Ordering Notes: (1) Specify desired frequency. (2) Specify desired channel(s). (3) Specify desired option. (4) Specify desired isolation value or tap value.

ORDERING INFORMATION:

RMDA 450-30	Stock No. 5500-43
RMDA 450-30P	Stock No. 5500P-43
RMDA 450-30S	Stock No. 5500S-43
RMDA 450-50	Stock No. 5500-45
RMDA 550-30	Stock No. 5500-53
RMDA 550-30P	Stock No. 5500P-53
RMDA 550-30S	Stock No. 5500S-53
RMDA 550-50	Stock No. 5500-55
RMDA 750-30	Stock No. 5500-73
RMDA 750-30P	Stock No. 5500P-73
RMDA 750-15S	Stock No. 5500S-71

SPECIFICATIONS ***RF***	***RMDA 550-30S*** ***#5500S-53***	***RMDA 550-30*** ***#5500-53***	***RMDA 550-30P*** ***#5500P-53***	***RMDA 550-50*** ***#5500-55***	***Units***
Frequency Range:	47-550	47-550	47-550	47-550	MHz
Channel Loading:	77	77	77	77	
Flatness:	±0.75	±0.75	±0.75	±0.75	dB
Gain:	33	33	33	50	dB
Noise Figure (a):	8.0	7.0	7.0	7.0	dB
Output Level:	+44 (c)	+44 (c)	+44 (c)	+44 (c)	dBmV
Test Port Level					
Input:	NA	-20, ±2	-20, ±2	-20, ±2	dB
Output:	NA	-20, ±2	-20, ±2	-20, ±2	dB
Gain Control Range:	15	15	15	15	dB
Slope Control Range:	10	10	10	10	dB
Composite Triple Beat - CTB (c):	-58	-60	-65	-57	dB
Cross Modulation - XMOD (c):	-61	-61	-68	-60	dB
Composite Second Order - CSO (c):	-58	-59	-62	-57	dB
Hum Modulation:	-70	-70	-70	-70	dB
Number of Hybrids:	1	2	2	2	
Hybrid Technology:	Push-Pull	Push-Pull	Power Doubling	Push-Pull	
Impedance - All Ports:	75	75	75	75	Ω
Return Loss					
Input:	14	14	14	14	dB
Output:	14	14	14	14	dB

NEW!

RF	***RMDA 750-15S*** ***#5500S-71***	***RMDA 750-30*** ***#5500-73***	***RMDA 750-30P*** ***#5500P-73***	***Units***
Frequency Range:	47-750	47-750	47-750	MHz
Channel Loading:	110	110	110	
Flatness:	±1.00	±1.00	±1.00	dB
Gain:	16	33	33	dB
Noise Figure (c):	7.5	7.0	7.0	dB
Output Level:	+44 (d)	+44 (d)	+44 (d)	dBmV
Test Port Level				
Input:	NA	-20, ±2	-20, ±2	dB
Output:	NA	-20, ±2	-20, ±2	dB
Gain Control Range:	15	15	15	dB
Slope Control Range:	10	10	10	dB
Composite Triple Beat - CTB (d):	-58	-54	-58	dB
Cross Modulation - XMOD (d):	-63	-58	-62	dB
Composite Second Order - CSO (d):	-58	-55	-58	dB
Hum Modulation:	-70	-70	-70	dB
Number of Hybrids:	1	2	2	
Hybrid Technology:	Push-Pull	Push-Pull	Power Doubling	
Impedance - All Ports:	75	75	75	Ω
Return Loss				
Input:	14	14	14	dB
Output:	14	14	14	dB

COMMON SPECIFICATIONS

GENERAL	
Power Requirements	
Voltage:	117 VAC, ±10%
Frequency:	60 Hz
Power (e):	10-21 W
Fuse:	1/2 A
Temperature Range:	-20 to +60 °C
MECHANICAL	
Dimensions (WxHxD):	19.00" x 1.75" x 5.13" (483 x 44 x 130) mm
Weight:	8.00 lb (3.64 kg)
CONNECTORS (Rear Panel)	
RF Input:	Type "F", female
RF Output:	Type "F", female

CONTROLS (Front Panel)	
Gain:	Control
Slope:	Control
INDICATORS	
Power ON:	LED, red
CONNECTORS (Front Panel)	
Input Test Port (f):	Type "F", female
Output Test Port (f) :	Type "F", female

NOTES:

(a) measured at full gain with 0 dB slope

(b) 60 channels at rated output capability

(c) 77 channels at rated output capability

(d) 110 channels at rated output capability

(e) power consumption depends on model selected. Range for all models given

(f) RMDA 450-30S, RMDA 550-30S and RMDA 750-15S do not have input and output test ports

Toll Free For Ordering!
800-523-6049
FAX 800-336-6295

Ordering Notes: (1) Specify desired frequency. (2) Specify desired channel(s). (3) Specify desired option. (4) Specify desired isolation value or tap value.

TRANSPORT 2000 AM Fiber Optic Systems
TR2100 Transmitters

TRANSPORT 2000 fiber optic products provide high bandwidth, multi-service transmission over single mode fiber. TR2100 Series transmitters are suitable for operation in applications such as:

- CATV Distribution
- Distance Learning
- Campus Networking
- Private Networks
- Video Conferencing
- Any AM-VSB Multichannel Requirement

TR2100 transmitters launch from a high power 1310 nm Distributed Feedback (DFB) laser diode. The transmitter circuitry maintains closed loop control of the laser temperature and the output power bias. An optical isolator insures peak performance by protecting the laser from optical reflections in the transmission path.

Multiple TR2100 model options are available to allow the proper cost, functionality and performance level to be selected for the application. These include five levels of optical output power and up to 110 channel transmission capacity:

TR2100-7715	110 Channel	12+ mW Output
TR2100-7713	77 Channel	10+ mW Output
TR2100-7711	77 Channel	8 mW Output
TR2100-7705	77 Channel	6 mW Output
TR2100-3210	32 Channel	4 mW Output

All of these basic models are also available with:

- 550 or 750 MHz transmission bandwidth.
- 110 VAC, 220 VAC or 48 VDC power.
- Customer specified optical connectors.
- 1.75" high 19" rack mount packaging.

General Specifications

RF Connector:	75 Ω "F" type
Test Point, dB:	-20, "F" type connector
Return Loss, dB:	16
Bandwidth, MHz:	40 to 550 or 40 to 750, 1 dB
Wavelength, nm:	1310 +/- 20
Optical Connectors:	FC, FC-APC, SC, SC-APC or ST
Operating Temp.° C:	10 to 50
Power Consumption:	21 Watts
Power Source:	85 to 132 VAC, 47-400 Hz
or	170 to 265 VAC, 47-400 Hz
or	36 to 76 VDC
Dimensions:	1.75" x 17.0" x 19.0"

Note: Specifications are subject to change for product improvement 6/96

Operation Levels*

TR2100	Channel Capacity, AM-VSB:	RF Input Level, dBmV	Optical Budget, dB †	Transmit Power (typ), dBm (mW)
-7715	110	21	10.0	11.0 (12)
-7713	77	24	13.0	10.0 (10)
	60	27	14.5	10.0 (10)
-7711	77	24	11.0	9.0 (8)
	60	27	12.5	9.0 (8)
-7705	77	24	5.0	8.0 (6)
	60	24	6.5	8.0 (6)
-3210	32	30	10.0	6.0 (4)
	16	34	12.0	6.0 (4)

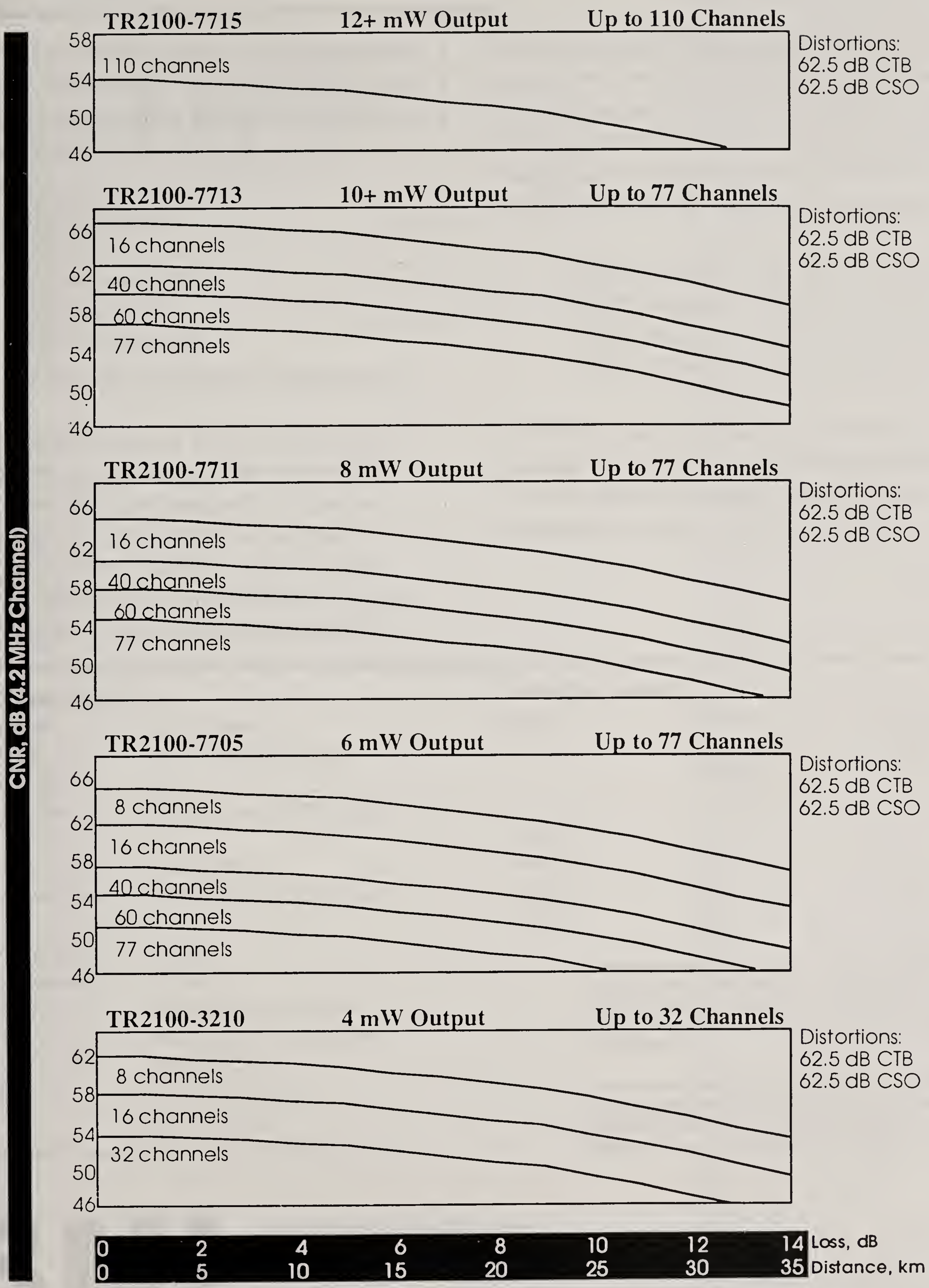
* 62.5 dB CTB, 62.5 dB CSO @ specified channel capacity & RF input level.

† The "budget" provides the specified RF output level from each TR2200 receiver.

BNI

Broadband Networks, Inc
2820 East College Avenue
State College, PA 16801
814-237-4073 fax: 814-234-2841

TR2100 Transmitter Performance Options



Note: Alternate CTB & CSO can be specified per the actual design requirements.

TRANSPORT 2000 AM Fiber Optic Systems
TR2200 Receivers

TRANSPORT 2000 fiber optic products provide high bandwidth, multi-service transmission over single mode fiber. TR2200 Series receivers are suitable for operation in applications such as:

- CATV Distribution
- Distance Learning
- Campus Networking
- Private Networks
- Video Conferencing
- Any AM-VSB Multichannel Requirement

TR2200 receivers integrate a high sensitivity, low reflection PIN photodiode with high linearity RF amplification and 20 dB test points. A passive interface from the photodiode to the internal amplification allows operation over the entire specified optical budget without external optical attenuators or an impact upon unit performance.

TR2200 receivers offer packaging, output level and bandwidth options to complete each transmission link with the best choice for the application. The following TR2200 models are packaged in either "R" designated 1.75" high 19" rack mount or "N" designated 9"x5"x3" desk/wall mount units:

TR2200-550(10)-x	550 MHz, 10 dBmV output
TR2200-550(38)-x	550 MHz, 38 dBmV output
TR2200-750(10)-x	750 MHz, 10 dBmV output
TR2200-750(38)-x	750 MHz, 38 dBmV output

All TR2200 receiver models include internal power supplies. "R" designated models are available with 110 VAC, 220 VAC or 48 VDC operation options. "N" designated models operate with 110 VAC.

General Specifications

RF Connector:	75 Ω "F" type
Test Point, dB:	-20, "F" type connector
Return Loss, dB:	16
Bandwidth, MHz:	40 to 550 or 40 to 750, 1 dB
Wavelength, nm:	1200 to 1600
Optical Connectors:	FC, FC-APC, SC, SC-APC or ST
Operating Temp.° C:	0 to 60
Power Consumption:	16 Watts
Power Source:	85 to 132 VAC, 47-400 Hz
or	170 to 265 VAC, 47-400 Hz
or	36 to 76 VDC
Dimensions:	1.75" x 9.0" x 19.0" 3.00" x 9.0" x 5.0"

Note: Specifications are subject to change for product improvement. 6/96

Operation Levels*

TR2200	Channel Capacity, AM-VSB†:	RF Output Level, dBmV †
- 550(10)	77	10.0
- 550(38)	77	38.0
- 750(10)	110	10.0
- 750(38)	110	38.0

* Receiver contributions to the CNR, CTB & CSO are included in the TR2100 specifications. Performance is referenced to transmission through the Optical Budget of the link's TR2100 transmitter.

† Channel capacity is determined by the TR2100 model used. The receiver's RF output level is specified when transmitting through the Optical Budget of the link's TR2100 transmitter.

BNI

Broadband Networks, Inc
2820 East College Avenue
State College, PA 16801
814-237-4073 fax: 814-234-2841

The Ideal Amplifier for Professional Sound Installations

Bryston's 3B NPB Pro Amplifier

With Bryston's new NPB series of amplifiers, it is finally possible to obtain the best audiophile performance without sacrificing bullet-proof reliability.

Virtually all of the professional amplifiers on the market boil down to one basic design philosophy; IC OP - amp input stage, switching transistor output stage, narrow-band circuit parameters, all connected to a single power supply.

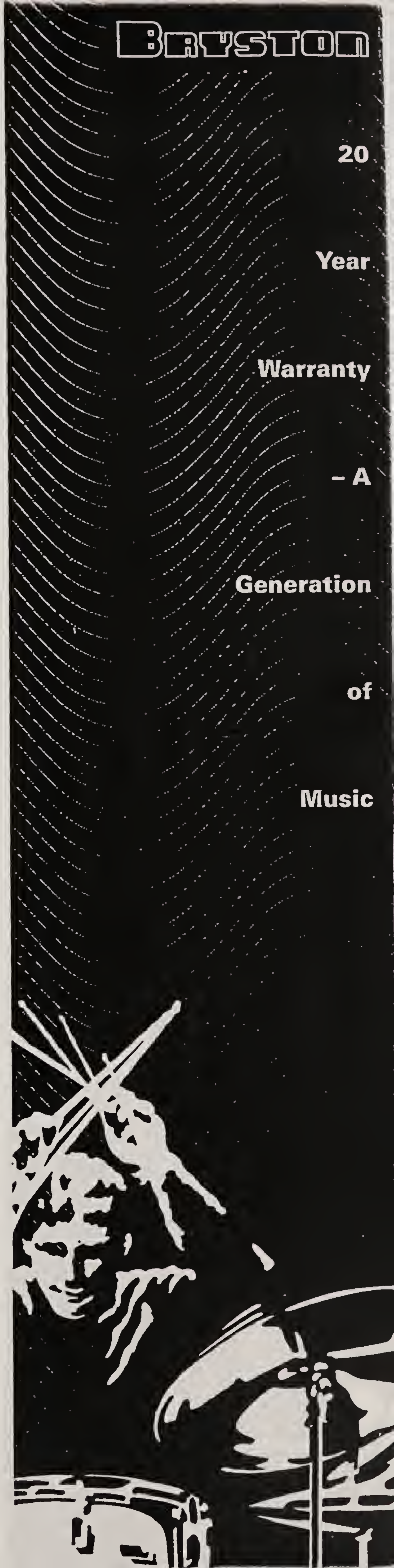
This approach, used for reasons of simplicity, may have been "good enough" in the past. Today, with vastly increased clarity and dynamic range in recordings, it is more important than ever before to use amplifiers which not only equal, but surpass the parameters of the most demanding material.

The new 3B NPB, like our 4B NPB and 7B NPB models, involves an approach radically different from other amplifiers. Bryston uses two completely independent power-supplies for the utmost separation and image clarity. We use discrete and symmetrical circuitry throughout for inherent wide-band linearity superior to any IC. Bryston's exclusive quad-complementary output section provides lower distortion, across the entire audio band, than any other amplifier design on the market today. The new 3B NPB sounds like what it is: effortless, smooth, clean and clear; musical.

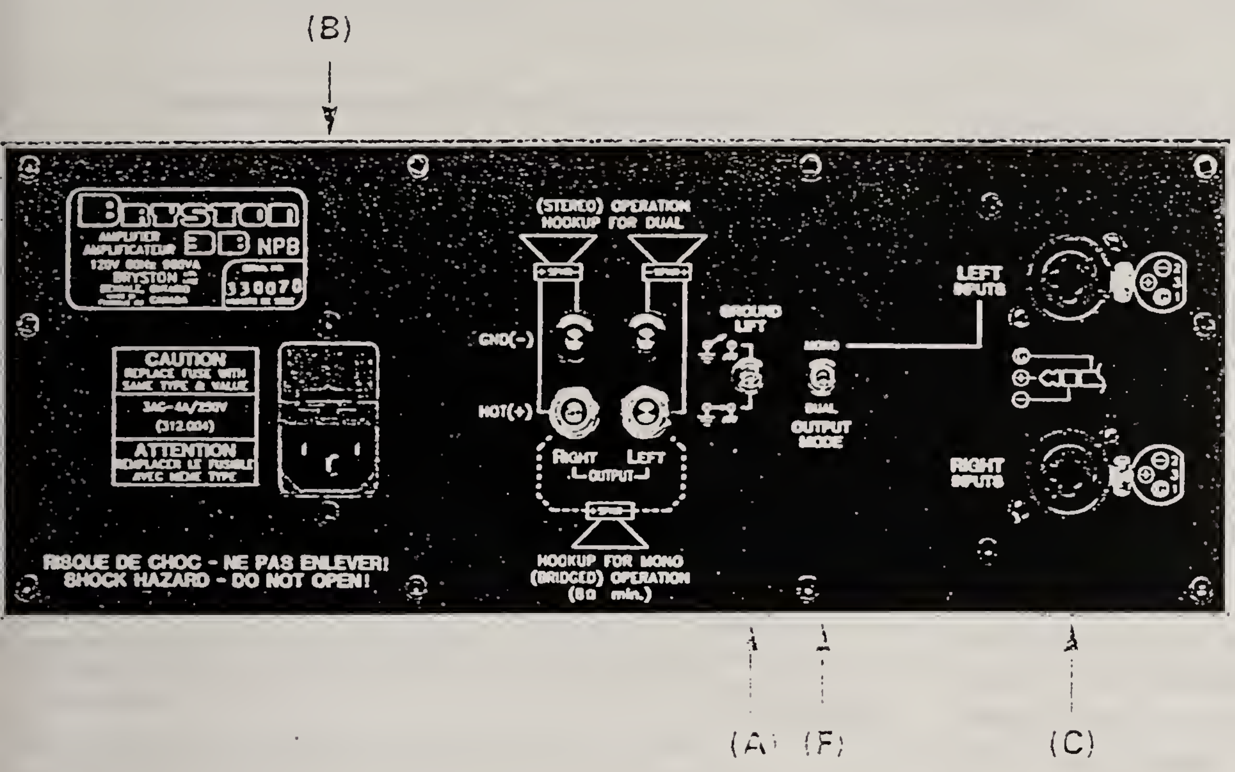
Beyond sonic excellence, the Bryston level of quality encompasses information, control and flexibility. New overload indicators which sense any form of distortion, front-panel gain controls, ground lift and bridge-mono switches on the back, balanced (or unbalanced) operation, are all standard.

With Bryston's 20 years experience in manufacturing the most reliable amps in the business, backed by the best warranty, (20 years parts and labour), you know they will keep on sounding superb long after the rest have lost their usefulness.

At Bryston we build the best, we sound the best, and we back it up, unconditionally.



Switching and Connections for the
Bryston 3B NPB Pro Amplifier



(A) Ground Switch
For normal hi-fi operations this switch connects the signal and chassis grounds together when in the connected position. For multi-amplifier installations, chassis and signal grounds may be separated .

(B) External Fuses
AC Line holders do not open with amplifier plugged in. Replace fuses only with size and type supplied (as listed on rear panel)

(C) XLR Balanced input

(D) LED Power/Fault Indicator

(E) Power Switch

(F) Output mode switch
Mono position - monaural output / Dual position - stereo output

3B NPB SPECIFICATIONS

Watts	**120 watts per channel, 8 ohms**
	200 watts per channel, 4 ohms
Distortion	**Less than 0.01% from 20 Hz to 20 kHz at 100 watts, IM or THD**
Noise	**100 dB below full output**
Crosstalk	**Below noise 20 Hz to 20 kHz at 100 watts**
Slewing rate	**Greater than 60 volts per microsecond**
Power bandwidth	**.5 Hz to over 100 kHz**
Damping factor	**Over 500 at 20 Hz, ref. 8 ohms**
Input sensitivity and impedance	**750mV in for full output, 30K balanced**
Features	**Stereo/mono switch**
	Over 3,200 cm² of heat-sinking; over 5,000 c with chassis
	Regulated power supplies to all voltage gain stages
	Gold plated input and output connectors
	Balanced XLR inputs, (may be used unbalanced)
	Warranty: 20 years parts, labour, shipping one way
Dimensions	**19 x 5.25 x 9 inches, 48.25 x 13.33 x 22.85 cm, wt: 28 lbs, 13 kg**

20 Year Warranty - A Generation of Music

BRYSTON
57 Westmore Dr., Rexdale, Ontario, Canada M9V 3Y6
Tel: (416) 746-1800 Fax: (416) 746-0308
Brystonvermont, 979 Franklin Lane, Maple Glen, PA 19002
Tel: 1-800-673-7899 Fax: (215) 628-2970

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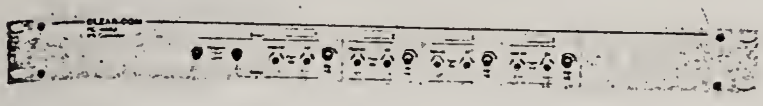
PROFESSIONAL SYSTEMS NETWORK INC.
PSNI

Clear-Com
Intercom Systems



IFB (Program Interrupt) Systems

▪ Modular system capable of operating as a stand-alone system, or being integrated with MS-808 Master Stations ▪ Transmits an interruptable program signal to individual talent receivers via standard 2-conductor shielded microphone cable ▪ Distributed amplifier system with the earphone amplifier located at the talent's position ▪ Features unlimited expansion capabilities (up to 96 talent channels and 50 control locations)

PIC-4000B IFB Electronics ▪ Contains all of the audio and switching circuitry for selecting 1 of 2 program signals, routing the signals to 4 independent talent channels and interrupting, with variable program attenuation, the signals from 1 or more control points ▪ Requires 24VDC power from a Clear-Com Intercom System or power supply. $798.00

MA-4 Talent Access Master Control Station ▪ Provides individual access to 4 talent channels and All Call access to all of the talent channels in the system ▪ Designed for direct console mounting or rackmounting in an optional rackmount adaptor ▪ Includes a panel mounted gooseneck microphone and all required local electronics. 695.00

AX-4 Talent Access Expansion Station ▪ Connects to the MA-4, expanding the talent channel selection capabilities by 4 additional channels per AX-4 ▪ Multiple AX-4 units can be linked together to control a maximum of 96 talent channels 500.00

TR-50 Talent Receiver ▪ This small, portable unit contains the amplifier to power the talent's earphone ▪ It connects to the PIC-4000B via standard 2-conductor shielded microphone cable ▪ A miniature in-the-ear receiver is included with each TR-50 . . . 123.00

TR-532 Stereo/Split Feed Talent Receiver ▪ Contains 2 discrete amplifiers to feed the "Interrupt" and "Noninterrupt" signals from the PIC-4000B on standard stereo earphones ▪ Provides a passive loopthrough output of the headset's microphone for on-air applications. 295.00

Beltpacks

RS-501 Beltpack ▪ Single-channel, lightweight beltpack ▪ All digital, noiseless, electronic switching ▪ Remote mic kill function ▪ Visual signaling ▪ Carbon type headset jack optional ▪ The RS-501 is the standard beltpack station for use in all applications ▪ Accepts dynamic or electret mics ▪ 4-pin male headset connectors, 3-pin male and female line connectors $215.00

RS-502 Beltpack ▪ 2-channel beltpack ▪ Allows access to either 1 of 2 separate intercom channels ▪ Includes all features of the RS-501, plus dual channel signaling ▪ Applications include video/theater production, industrial ▪ 4-pin headset connector, 6-pin female line connector (no loopthrough, programmable options) 299.00

Note: RS-502 requires YC-36 adaptor to connect to a standard Clear-Com system.

RS-502-TW 2-channel, 4-pin headset, 3-pin male and female connectors, channel B call light only, programmable options 332.00

Note: RS-502-TW requires TWC-10 adaptor to connect to a standard Clear-Com system.

RS-522 Stereo Beltpack ▪ 2-channel, dual listen, binaural beltpack ▪ Allows completely selectable simultaneous listening and talking on 2 separate channels ▪ Binaural split-feed headset output ▪ Includes all features of the RS-501 and RS-502 ▪ Applications include video/theater production, industrial, lighting design 336.00

RS-522-TW Stereo, 2-channel, 3-pin cable 332.00

Que-Com Intercom Components
Que-Com Headset Intercom System

Intercom

SMQ-1

▪ High performance 2-way communications ▪ Wide frequency response and high volume ▪ All metal beltpack with belt clip ▪ Clear-Com compatible ▪ Noise cancelling mic ▪ Mic switch and volume control ▪ Interconnects with standard mic cable ▪ Permanently attached, lightweight, noise-isolating headset ▪ Soft ear cushions and adjustable headbands

Power Supply

▪ Supports up to 400 headset stations ▪ UL and SA listed ▪ Line and load regulated ▪ Short circuit protected

SMQ-1 Que-Com single muff headset/beltpack. $199.50

DMQ-2 Que-Com double muff headset/beltpack 232.00

PK-5 Power Supply ▪ Portable regulated power supply ▪ Single channel ▪ Operates up to 25 headset stations 164.00

Dynamic Headsets
CC-85/250 Pro-40 Communications Headsets

▪ Virtually indestructable ▪ Designed for comfort ▪ Broadcast quality ▪ Balanced microphone output ▪ Separate earphone wires for binaural split ear use ▪ Left or right side mic operation ▪ Low profile on-air appearance ▪ Dual chamber ear cushion for maximum acoustical isolation ▪ Mic switch in boom ▪ Noise rejecting mic ▪ Fully field serviceable ▪ Noise attenuating earmuffs ▪ Single or double muff ▪ Replaceable washable ear socks ▪ Dynamic transducer ▪ Excellent mic isolation for minumum crosstalk

CC-85

CC-85 Pro-40 single muff headset $175.00

CC-250 Pro-40 double muff headset 217.85

CC-250-6 Same as CC-250 with 6-pin female XLR type connector wired for "split-ear" operation. 225.85

CC-85-R Same as CC-85 with 4-pin male XLR connector. RTS compatible. . . 181.00

CC-250-R Same as CC-250 with 4-pin male XLR connector. RTS compatible. 223.85

CC-250

CC-26 Headset ▪ Single muff ▪ 6' straight ultrathin cord ▪ Ultra-lightweight headset (2¼ oz.) ▪ Dynamic, noise-cancelling mic element (4-pin XLR) $142.00

PH-7 Headset ▪ Double muff ▪ High fidelity ▪ Noise cancelling ▪ Most sound attenuating model . . . . POR*

HS-6 Handset ▪ Telephone style headset with push-to-talk switch 90.00

PT-4 Mic ▪ Rugged push-to-talk mic ▪ Mounting clip included, 2' coil cord (4-pin female XLR type connector) 60.00

*Price On Request

ADDITIONAL PRODUCTS AVAILABLE. PLEASE CALL.

Clear-Com
Intercom Systems

Main Stations

A Main Station is a combination intercom station and system power supply.

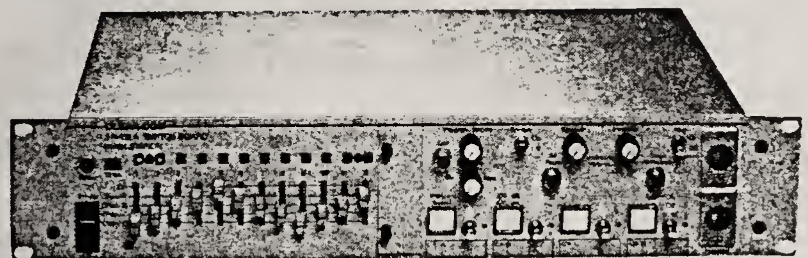
CS-222 Portable Main Station 2-channel headset station. Remote mic kill. Mic/line program input with IFB/interrupt. Stage announce. A+B "Link" switch. Separate channel listen level controls and call buttons. Power supply features special "auto restore" overload/short circuit protection. Applications include: theater, concerts, sports (coach-to-spotter), rental firms. Supports up to 30 headset stations or 10 speaker stations $730.00

RK-101 Rackmount kit for CS-222 and PS-22. 2 RU (3.5" H). . .75.00

MS-222 Rackmount Main Station 2-channel speaker and headset station. Remote mic kill. Mic/line program input with IFB/interrupt. Stage announce. A+B "Link" switch. Separate channel listen level controls and call buttons. Applications include: fixed installations, theater directors and stage managers, video trucks and facilities, sports arenas. 2 RU (3.5"H). Supports up to 30 headset stations or 10 speaker stations 870.00

MS-400A Main Station 4-channel rackmount headset/speaker operation, 2A power supply, mic/line program input, SA (stage/studio announce) output, user-selectable program interrupt (IFB) and ISO function (3.5" H) $1228.00

MS-440 Main Station 4-channel rackmount headset/speaker operation, 2A power supply, multiple program inputs, program audio monitoring, 3 built-in IFBs for talent cuing, microprocessor controlled logic, all talk function 1195.00



SB-412A Main Station 4-channel, same specs as MS-400A, but no speaker (has ext. speaker jack). Has switch matrix to assign each of 12 stations (or 12 groups) to any of the 4 channels or a disconnected off-line. Applications include: video production/ theater with constant repatching needs. $1891.00

SB-440 Main Station 4-channel, same specs as MS-440, but includes a 5 x 10 assignment matrix, which permits 4-channel groupings with off and party line positions, plus an easy access subpanel 1695.00

MS-812 Master Station Rackmount microprocessor based with menu-driven programming. Provides 8 Party-Line Intercom channels expandable to 12. Has a standard gooseneck mic, visual and audible signaling, separate listen and talk buttons, individual channel listen level controls, 4 preset buttons, adjustable button brightness, and the ability to program internal and external IFB and ISO, privacy, relays, "walkie talkies" and much more. Up to 4 programmed "setups" can be stored. Individual button assignments can be stored in presets. Selectable program signal feed to any of the intercom channels.

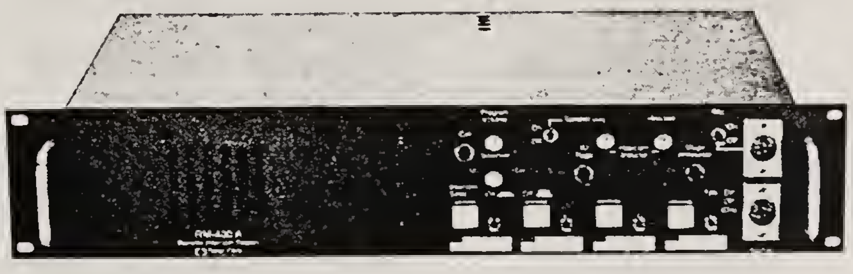
MS-812-8 8-channel master station. $3395.00
MS-812-12 12-channel master station. 3695.00

Rackmount Remote Stations

A remote station does not contain a power supply. It obtains DC power from a system power supply or main station.

MR-102A Headset Station 2-channel (A or B selectable) headset station mounts in console or standard 2-gang electrical box (headset operation only) $208.00

MR-104A Same as above, except 4-channel selectable 284.00

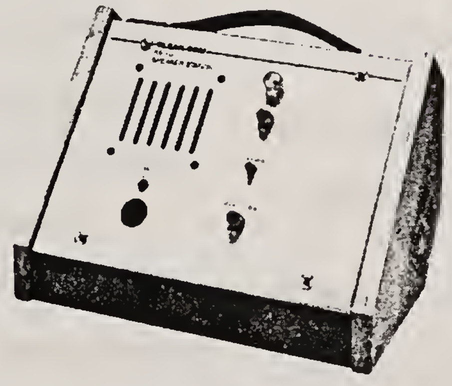


RM-400A Remote Station 4-channel headset/speaker station, rackmount mic/line level program input, SA (stage/studio an-nounce) output, user-selectable program interrupt (IFB) and ISO function (3.5" H) $995.00

RM-440 Remote Station 4-channel headset/speaker station, same as the MS-440, except requires no external AC power supply, no circuit breaker and no linking function, it is powered directly from the intercom line. 975.00

KB-111A Speaker Station 2-channel select speaker station, uses handset or push-to-talk mic. Mount in 6" x 8" electrical box or portable enclosure. Applications include: theater/security . . . 297.00

KB-112 Speaker Station with push-to-talk mic; talk/listen can be controlled remotely. All functions selectable. Applications include: dressing rooms/paging/security. 297.00



KB-112

Enclosures for KB-111A and KB-112 Speaker Stations

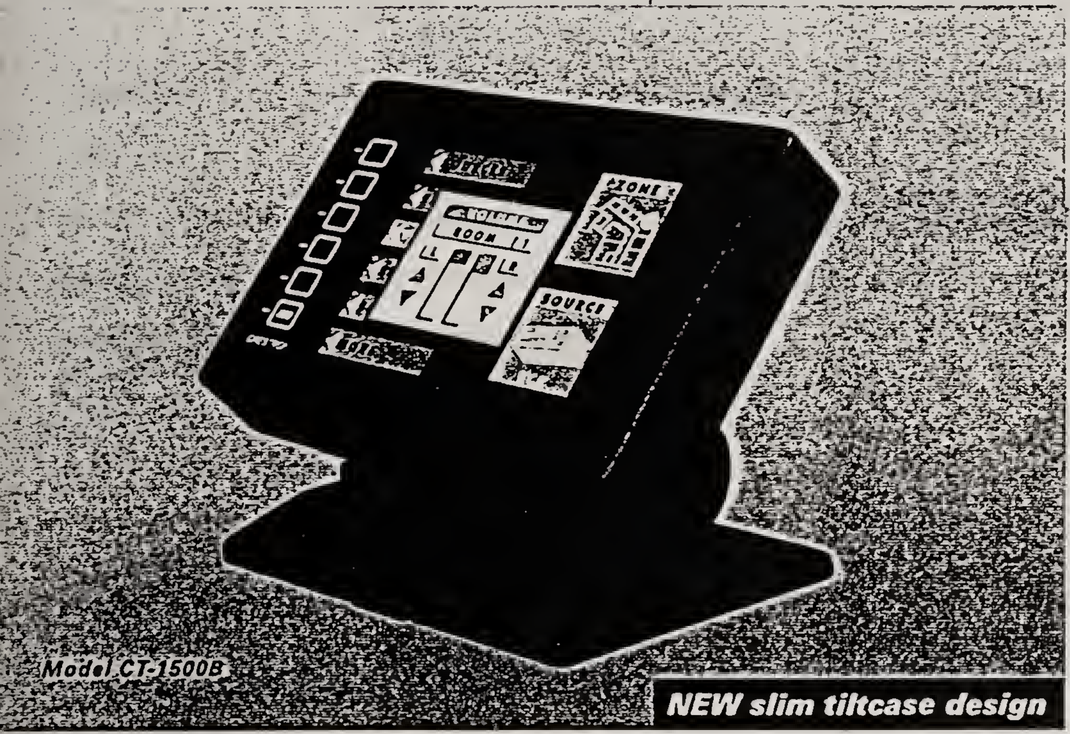
P-Box Portable wedge shaped enclosure, metal and wood construction, for KB-111A (single channel only) and KB-112 . . . . $141.00

M-Box Portable rectangular shaped enclosure, metal construction, for KB-111A (single channel only) and KB-112 . . . . 117.00

ADDITIONAL PRODUCTS AVAILABLE. PLEASE CALL.

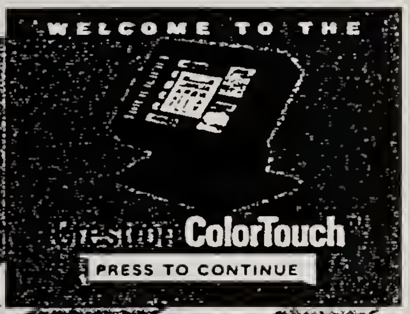
COMPACT COLOR REMOTE CONTROL TOUCHSCREEN

Crestron **ColorTouch**℠ CT-1500
Color Touchscreen Control Panel



Model CT-1500B

NEW slim tiltcase design



Import Photographs and Download Custom Fonts

Incorporate Color Icons and Dynamic Feedback Graphics

Pop-Up Subpanels Expand Your Control Options

The Crestron ColorTouch℠ CT-1500 delivers all the benefits of touchscreen color control in a compact, 6-inch display.

The Crestron ColorTouch℠ is ideally suited to applications where a low-profile, high-clarity, touchscreen is needed – discreetly placed on a small table or mounted into a wall:

- *home automation*
- *boardrooms*
- *training facilities*
- *conference centers*

Crestron, the pioneers of color remote control touchscreen panels, introduces the latest addition to the ColorTouch℠ family – the ColorTouch CT-1500.

ColorTouch gives you all the benefits of color in a user interface: color photographs, icons, graphics and text dramatically increase the user's comprehension of the control environment. Devices, functions and control zones are quickly organized and more easily accessed.

As part of our Crestron Windows®-based, unified software platform, Crestron VisionTools℠ software makes it easy to create unlimited control screen variations incorporating photographs, two- and three-dimensional graphics and text, in a full range of color. Pop-up subpanels and downloadable fonts help fully customize any control environment.

Save, test and modify control screens prior to installation, saving time and money.

- simplified color palette
- pop-up subpanels reduce memory requirements, providing optimal speed and performance
- multiple button, slider control and icon configurations
- up to 999 functions and 96 screens
- import photographs, drawings and icons
- supports downloadable fonts – proportional and non-proportional
- foreign language text
- operates on the Cresnet II Control System Network
- optional feature button panel
- RS-232 interface for stand-alone applications
- printout of screen designs on standard printer

CRESTRON COLOR

CRESTRON
REMOTE CONTROL SYSTEMS

SPECIFICATIONS AND DIMENSIONS

Crestron **ColorTouch**℠ CT-1500
Color Touchscreen Control Panel

MANUFACTURER 1995 ICIA OF THE YEAR

SPECIFICATIONS

Viewing Screen

Size:	6" diagonal (3.55" H x 4.70" W)
Resolution:	320 x 240 pixels
Display:	Passive matrix LCD
Illumination:	Backlit fluorescent
Touch Screen:	Resistive Membrane

Physical

Enclosure:	High impact, black molded plastic tiltcase

Communication Ports

Cresnet II:	Four-wire screw terminal type connector
RS-232:	*please specify when ordering*

Memory

Size, Type:	128Kbytes flash memory for display panels

Power Requirements

Cresnet II Power Factor:	12 watts
Power Supply:	24 VDC 0.5 Amp

Other Crestron ColorTouch models available:

ColorTouch(CT-3000) 10-inch, 256 color display; pop-up windows; downloadable fonts; graphics import capabilities; optional feature button panel in tiltcase, lectern mount or wall mount.

Other Color Touchscreen Control Products available from Crestron:

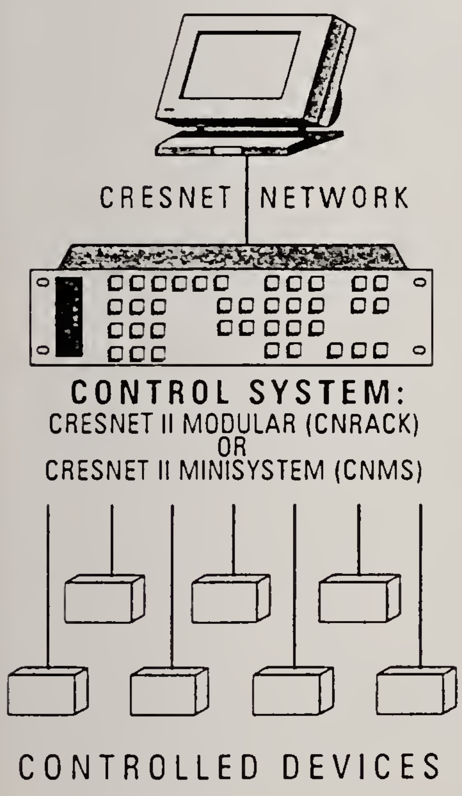
Crestron VisionTouch℠ [VT-4000L]: 10.4-inch LCD display. Integrates multi-standard video with RGB computer graphics display and color control. 4 video inputs, RGB computer input. Lectern mount.

Crestron VideoTouch℠ [VT-3000]: 6-inch video display, with color control capabilities. 1 video input. NTSC and PAL versions. Tiltcase or lectern mount.

Crestron VisionVGA℠ [VT-4000M]: All the multimedia capabilities of the VisionTouch, using any VGA monitor as the display.

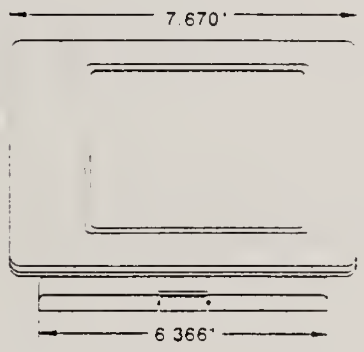
Crestron VisionPC℠ [VT-4000C]: Windows®-based software for the creation and control of all remote control requirements.

USER INTERFACE: COLORTOUCH



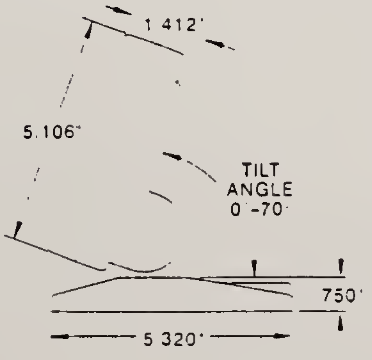
Contact Crestron Technical Support for more detailed block diagram examples

COLORTOUCH
TILTCASE (CT-1500,CT-1500B)
FRONT VIEW

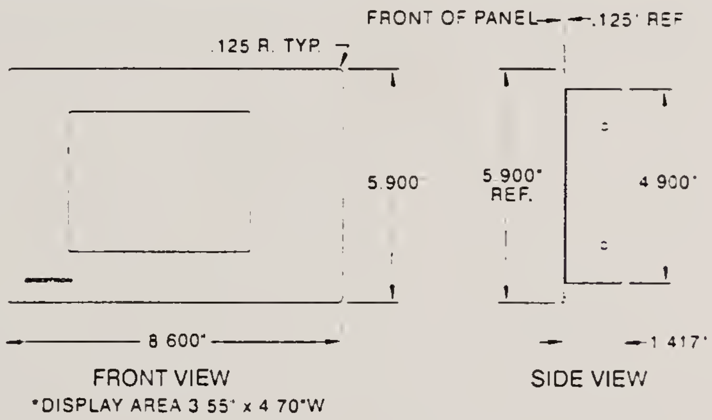


* DISPLAY AREA 3.55" H x 4.70" W

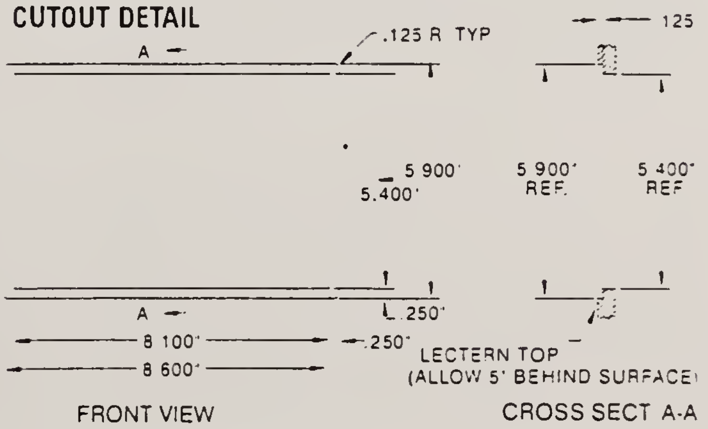
SIDE VIEW



COLORTOUCH
LECTERN MOUNT (CT-1500L, CT-1500BL) FRONT VIEW



LECTERN
CUTOUT DETAIL



CRESTRON
REMOTE CONTROL SYSTEMS

Crestron Electronics, Inc. USA
101 Broadway Cresskill, NJ 07626
Tel: 800.237.2041 / 201.894.0660
Fax: 201.894.1192
BBS: 201.894.1317

Crestron Europe
Mereldreef 74
3140 Keerbergen - Belgium
Tel: +32.15.73.09.74
Fax: +32.15.23.35.79

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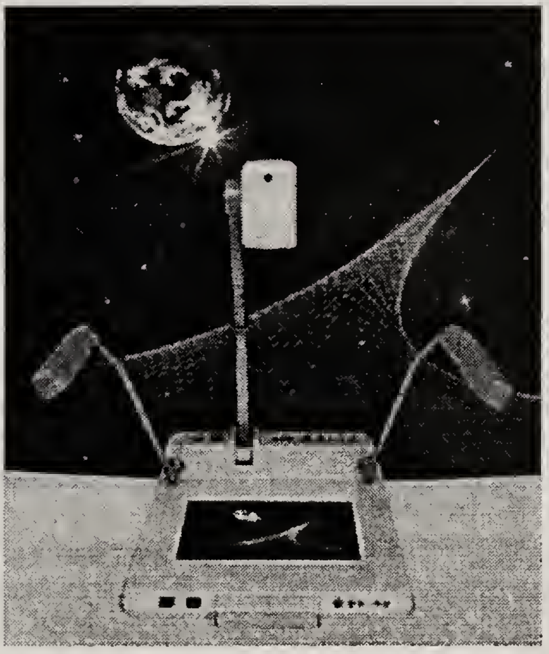
CSI
COMMUNICATIONS SPECIALISTS, INC.
AV SOLUTIONS, INC.
AVS

ELMO
technological innovations since 1921



INTRODUCING ELMO'S LATEST IN A SERIES... THE EV-368 VISUAL PRESENTER

The EV-368 Visual Presenter combines the "EASE OF USE" operating principle along with the latest video technology, design, and functionality for today's most demanding professional presenter.

Built in (A4) Illuminated light Source (296x216mm)

An illuminated base light has been engineered into the base panel to allow X-rays, transparencies, slides and negatives to be viewed conveniently.

Clear Images Even Without Special Lighting

No special lighting is required in rooms with normal brightness. An optional lighting unit (LU-100) is available where room illumination is insufficient or when working with a video projector.

1/2" 360,000 Pixel CCD Chip

The EV-368 has increased the resolution to 360,000 pixels which yield over 400 +T V lines (horizontal).

Can ALSO be Used As a Conventional Video Camera

By removing the adaptor lens, you can tilt the camera head a full 90 degrees to use as a conventional video camera.

The MS-100 Shoe Adaptor

The MS 100 shoe adaptor has been designed to be compatible with all 4"-5" color L C D monitors available from other manufacturer In offices where space is a problem you can mount a viewing monitor onto the EV-368 without any additional space needed.

Convenient Front Controls

The Elmo EV-368 now has all camera control functions on the front of the base panel. These functions include, 8:1 manual zoom control, power focus control, auto iris with fine adjustment, with on/ off top control and base light select switches. All EV-368 controls are right at your fingertips!!

S-Video (Y/C) Output

A third S-Video output (Y/C) has been included to the EV-368 to achieve better resolution with less noise and more flexibility to users who have standardized on this format. The S-Video format will also serve as a higher quality video standard for front video projectors in boardrooms and training rooms.

Manual Color Correction

The color corrector function permits the operator to alter the original colors and fine adjust for color enhancement of all materials from the original exposure.

Built-in Positive-Negative Switching function

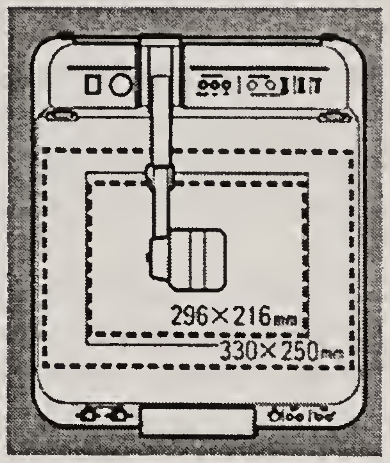
This handy feature allows you to display negatives as positive images on the screen by flipping a single switch.

Color to Black and White Conversion Switch

The color to black and white switch allows printed black and white documents to be viewed more precisely when color is not needed.

Three-way AV source select/Switcher Built in

The Visual Presenter EV-368 includes input facilities for two external video sources. You can hook up a video floppy disk player and a VCR, for example, and use the AV selector to switch between sources. One touch is all it takes to select still video floppy disk images or moving images from the VCR. There are also two video outputs, so in addition to the main TV screen, you can also hook up a second, smaller, TV set as a monitor or a VCR to record the presentation.



Compact Design Goes Anywhere

The Visual Presenter EV-368 is compact in size and lightweight making it very portable.
It requires very little space when stored upright, and its design makes it easy to give more effective video presentations.

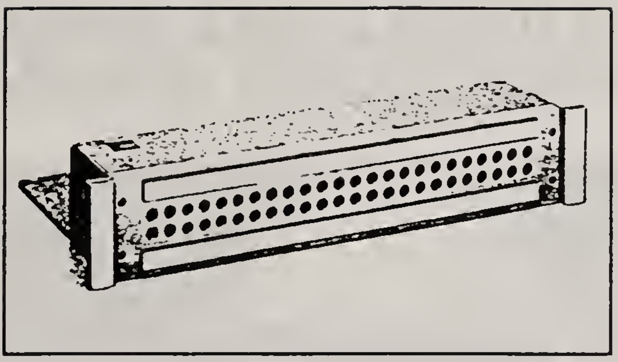
External Synchronization Function

EV-368 is fully compatible with all, video equipment that has external synchronization (genlock).

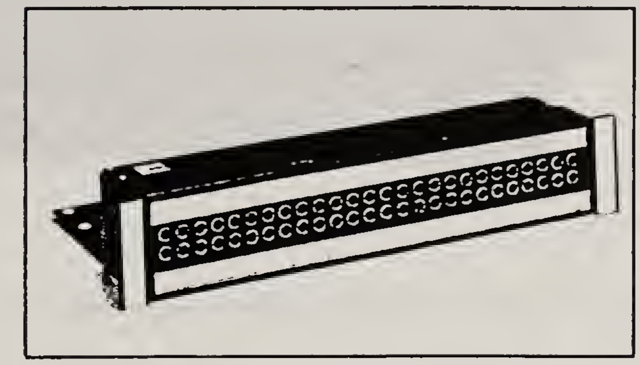
Built-in Preamplifier for Microphone Input

The use of an optional accessory microphone connected through the Visual Presenter to a house amplifier system, VCR or TV set, allows the presenter to be heard by everyone in the audience.

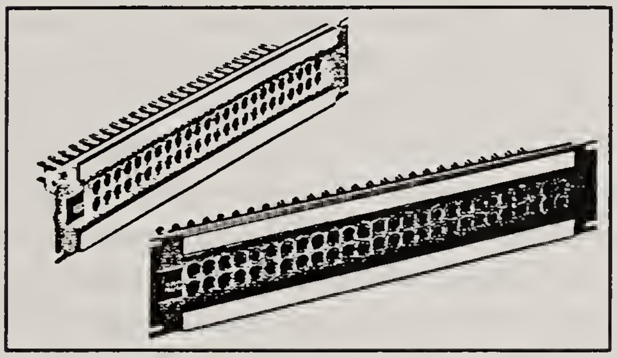
Analog and Serial Digital Video Panels



Professional Video Series (PV)



Professional Video Series (PV)



Video Patch Panels (PPI)

The Professional Video (PV) family of products incorporates the ultimate in cable management. All panels feature a solid aluminum chassis with an insulated face plate, a top cover, side brackets, and a cable tray which provides superior cable support and strain relief, as well as maximum jack protection.

The Video Patch Panel (PPI) products, utilize a standard one or two rack space insulated aluminum faceplate with an attached phenolic panel. This design has evolved into the industry standard.

Both the Professional Video (PV) series and PPI series incorporate the SJ2000 jack, designed to accommodate both analog and digital signals up to D3. Both types of video panels come with your choice of terminating or non-terminating jacks and are offered in 2 x 24 or 2 x 26 versions.

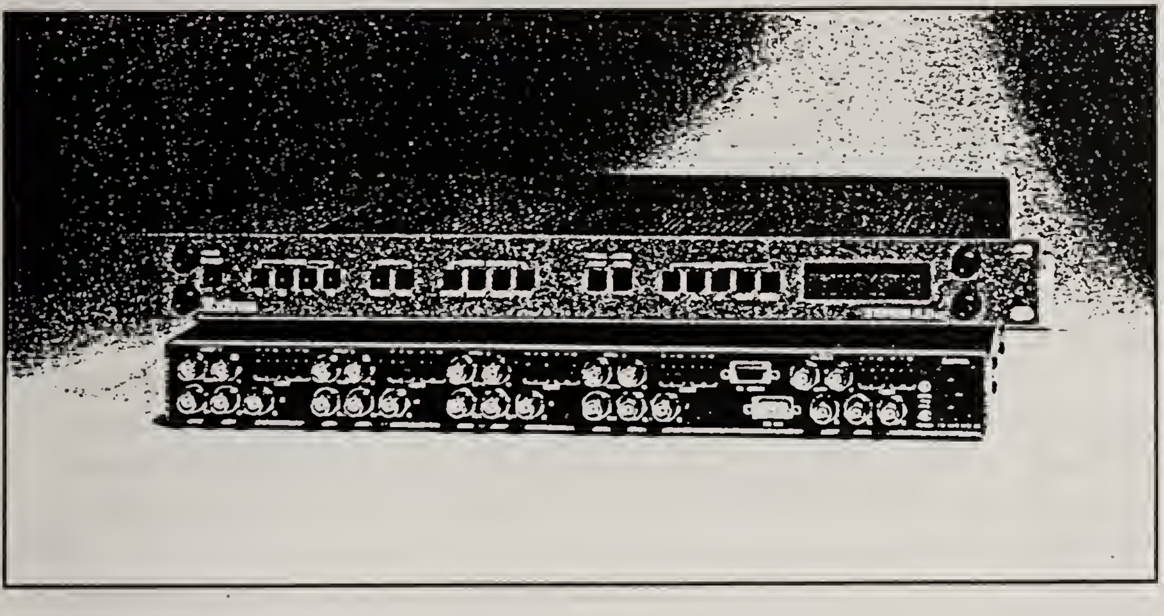
See drawings on page 88, Figures 27, 28, 29 and 30.

Ordering Information

Description	Catalog Number		
	Unloaded	Loaded with SJ2000N	Loaded with SJ2000N-75
Professional Video Panels,			
3.5" x 19" (8.89 x 48.26 cm) rack mount			
2 x 24 circuit			
Grey	PV224G	PV224G-N	PV224G-75N
Black	PV224B	PV224B-N	PV224B-75N
2 x 26 circuit			
Grey	PV226G	PV226G-N	PV226G-75N
Black	PV226B	PV226B-N	PV226B-75N
Video Patch Panels			
3.5" x 19" (8.89 x 48.26 cm) rack mount, Grey			
2 x 24 circuit	PPI2224RS	PPI2224RS-N	PPI2224RS-75N
2 x 26 circuit	PPI2226RS	PPI2226RS-N	PPI2226RS-75N
1.75" x 19" (4.45 x 48.26 cm) rack mount, Grey			
2 x 24 circuit	PPI1224RS	PPI1224RS-N	PPI1224RS-75N
2 x 26 circuit	PPI1226RS	PPI1226RS-N	PPI1226RS-75N

24-HOUR
SUPPORT

SYSTEM 4LD*ex*
FOUR INPUT, ONE OUTPUT SCAN DOUBLER/LINE DOUBLER WITH MOTION MODE COMPENSATION



APPLICATION

The System 4LD*ex* Switcher is a 300 MHz universal, four-input switcher with a built-in video to RGBS decoder and scan doubler/line doubler with full motion mode compensation. Allowing complete digital control of every major brand of video, data and graphics digital projector, the System 4LD*ex* includes a built-in microprocessor that is capable of computer signal switching and "breakaway" switching of audio from all input signal types (video, S-Video, RG$_s$B, RGBS or RGBHV) either through a front panel LCD driven menu or external RS-232 control. Because the System 4LD*ex* decodes & scan doubles all incoming video or S-Video signals to RGBS all video sources are crisp, clear and virtually free of "chroma noise" associated with composite type signals. In addition the displayed images are free of motion artifacts because of a true motion compensation circuit. The microprocessor within the System 4LD*ex* also gives complete flexibility to allow each of the four audio inputs (routed on captive screw connectors) to either "follow" its respective video or RGB input or be "broken-away" for selective audio-follow-video or RGB switching. And, the built-in projector control (because it works the same as a projector manufacturer switcher does) allows any user of a large screen presentation system to use the System 4LD*ex* as a signal enhancer and switching system, transparent to the user. The customer simply uses the projector manufacturer's remote control to switch and route all video sources. The System 4LD*ex* does the rest with complete "talk and listen" control with every major projector brand. Each input on the System 4LD*ex* is universal as it can accept video, S-Video (S-VHS), RG$_s$B, RGBS, RGBHV and all with audio follow: there is no need to select a specific input module type since every input is universal, and changeable in a matter of seconds.

FEATURES

- Built-in universal projector control
- Built-in video or S-Video scan doubling/line doubling to RGBS (NTSC or PAL)
- 300 MHz RGB Bandwidth
- LCD Menu driven front panel and control
- Universal inputs (RGBS, RG$_s$B, RGBHV, video and S-Video)
- RS-232 remote control
- Loopable with System 8/10 PLUS and MX Series Switchers
- Video controls include: color, hue, contrast, and horizontal shift
- Balanced or unbalanced stereo audio follow (or breakaway) switching on captive screw terminals
- Professional front panel tactile switch buttons
- Split-screen mode shows NTSC/PAL video and line doubler video side by side on the same screen
- Two line doubling modes: motion mode compensation and still frame
- Compatibility with Sony, Barco, Ampro, Hughes, Runco, Mitsubishi, Electrohome, Panasonic, Toshiba and NEC projectors and more (uses their remote control for input selection)

FEATURES CONTINUED

- Line doubles video, S-Video and RGB signals (i.e. document cameras)
- RGBS or RGBHV output to the projector or monitor
- 1U high, 19" rack mountable enclosure with internal auto-switching IEC power supply

ADDITIONAL UNIQUE FEATURES

- Universal projector control: Exclusive to Extron, the System 4LD*ex*, like its sister products the System 8 PLUS and 10 PLUS, has Extron's universal microprocessor projector communication protocol allowing it to be connected to any digitally controllable projector made by Ampro, Barco, Electrohome, Hughes/JVC, Mitsubishi, NEC, Panasonic, Runco or Sony and control all of its functions through their remote control device. Furthermore, the projector communications built into the System 4LD*ex* allows the switcher to "talk-back" to the projector and tell it which input is selected and which saved convergence memory blocks to pull its data from. This universal communications allows one switcher with two to three times the performance of a standard projector switcher to control ALL projector brands, making it easy to learn and install. Because the System 4LD*ex* is compatible with all major projector brands, all that needs to be done to make it communicate with each brand is to simply set a few dip switches.
- RS-232 remote control: The System 4LD*ex* also includes a rear panel RS-232 control connector. Capable of being controlled from a host terminal, PC, MAC or remote control system, the System 4LDex's communication is bi-directional making front panel, RS-232 or external remote control input selection "seamless" as each communicates with the other through the host on-board microprocessor. Also through the universal RS-232 control connector, multiple switchers can communicate with each other when connected in a looping configuration.
- Typical system configuration: A typical system configuration consists of the System 4LD*ex* switcher itself, along with the following equipment: (1) communications adapter (specified for the brand of the connected projector) and (1) CC 50', CC 100' or CC 200' (switcher to projector communications cable)

SYSTEM 4LD*ex* CONTINUED. . .

BANDWIDTH

300 MHz (-3 dB)

OPTIONAL ACCESSORIES

IR 20 SYS 4/AV	70-036-02	$425.00
S-VHS-BNC adapter	26-353-01	$35.00
Captive screw audio connectors	10-163-01	$2.95

SPECIFICATIONS

Video

Bandwidth	300 MHz (-3 dB)
Return Loss at 10 MHz	25 dB
Crosstalk at 10 MHz	-35 dB
Isolation at 10 MHz	-55 dB

Audio

Frequency response	20 Hz to 20 kHz
Signal to noise ratio	-85 dB Max
Total harmonic distortion	-78 dB
Peak to peak voltage	8 volt p-p

Inputs

Type	4 inputs, stereo, balanced
Connectors	Captive screw connector, 6 conductor
Impedance	>10 k ohm, AC coupled
Maximum level (balanced or unbalanced)	11.2 dBu
CMRR	>60 dB typical

Throughput

Routing	1 of 4 stereo routing
Response	±.05 dB 20 Hz to 20 kHz
Gain adjustment	-95 .5 dB to +31.5 dB, both left and right stereo channels per input
THD + Noise	0.002% worst case, +10 dBu input, +10 dBu output, balanced input and output
S/N	>95 dBu, 0 dBu reference
Adjacent input crosstalk	Better than 85 dB from 20 Hz to 20 kHz
Stereo channel separation	60 dB from 20 Hz to 20 kHz

Output

BNCs for RGBHV, video, S-Video and captive screw connectors for stereo audio

Type	1 output, stereo balanced
Connectors	Captive screw connector, 6 conductor
Impedance	50 ohms

Gain

Output taken single ended	0 dB± channel throughput gain
Output taken differentially	±6 dB channel throughput gain
Gain error	±.2 dB channel to channel
Muting	>95 dB
Drive	+11.2 dBu into 600 ohms

Other

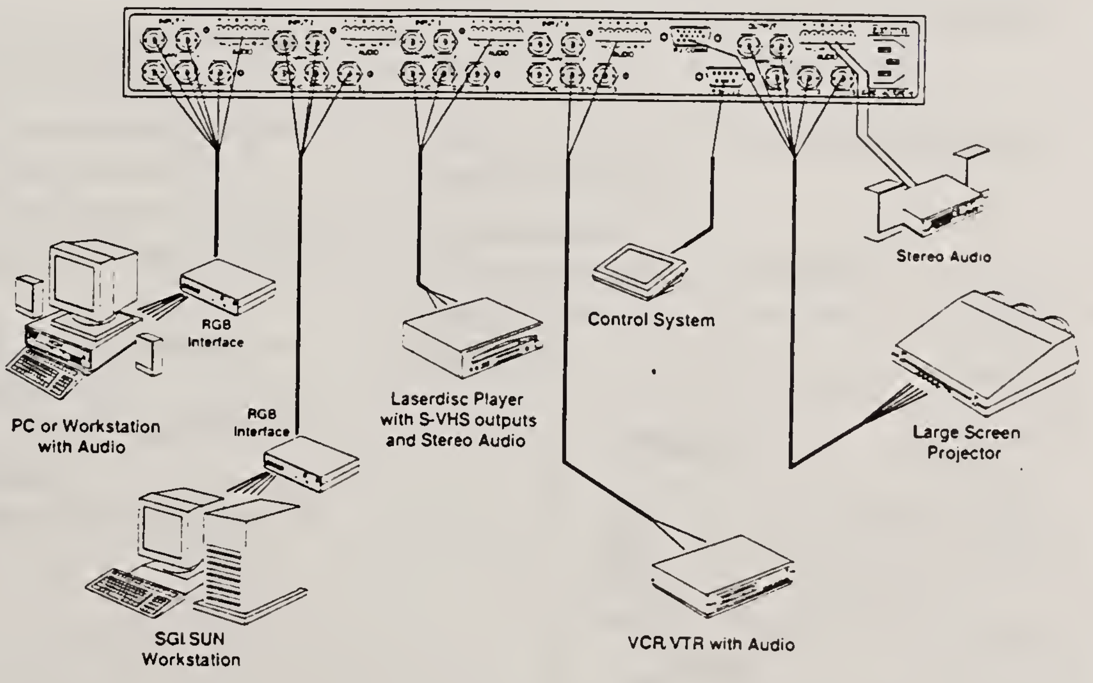
Switching speed	5mS (max)
Power supply	100-240 VAC, 50/60 Hz Internal auto-switchable
Power consumption	30 watts
Operating temperature	0° - 50° C
Storage temperature	-20° - +70° C
MTBF (demonstrated)	30,000 hours
Approvals	CE mark, UL & CUL pending
Dimensions	19" W x 1.74" H x 16.2" D 48 W x 4.4 H x 41 D cm
Shipping weight	21 lbs. (9.5 kg)
Warranty	Two years, parts & labor

PART NUMBER

System 4LD*ex*
Metal enclosure

World version:	60-155-01
List price:	$4295.00

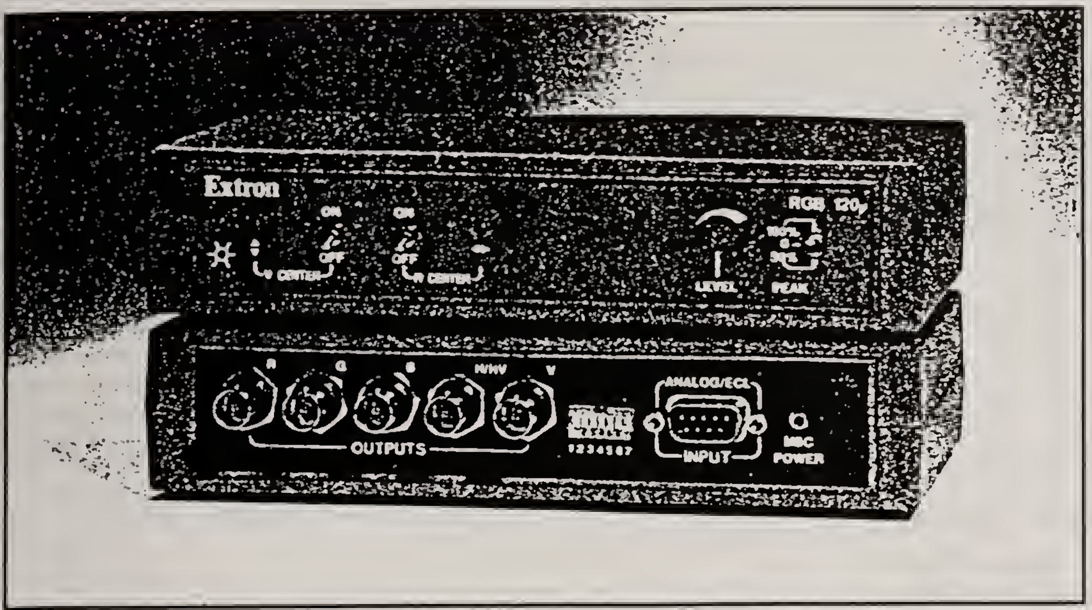
System 4LDex Rear Panel



24-HOUR SUPPORT

RGB 120*p*

UNIVERSAL ANALOG/ECL COMPUTER INTERFACE



APPLICATION

The Extron RGB 120*p* is a 200 MHz universal analog/ECL computer-video interface, compatible with any analog computer signal from 15-125 kHz. The RGB 120*p* provides compatibility with popular computer systems such as VGA, Super VGA, XGA, XGA-2, MAC, Quadra, SUN, Silicon Graphics Indigo and more. The 200 MHz RGB video bandwidth of the RGB 120*p* maintains signal integrity for all PC level computers and most workstation systems. Enhancement features such as variable signal level control and peaking allow for variable cable distances up to 200 feet without any reduction in signal quality. When using the RGB 120*p* with an Extron MBC or MBC Buffer input cable, simultaneous viewing of the connected computer's monitor and connection of a compatible large-screen presentation monitor or projector may be accomplished.

FEATURES

- Horizontal and vertical centering - Allows the input computer source to be shifted horizontally or vertically on the presentation monitor or projector's screen (with ON/OFF switch)
- Variable level control - Allows for adjustment of the video level of the displayed image. This control is similar to a brightness control on a data monitor.
- Peaking - Adjusts the sharpness of the displayed image. Similar to a sharpness control on a data monitor, peaking compensates for high frequency loss due to cable capacitance and system bandwidth loss
- Automatic sync output detection - Automatically senses which outputs are being utilized on the RGB 120*p* and sends sync through the proper channel. If coax cables are connected to the red, green and blue BNC connectors, sync is automatically sent on the green channel. If coax cables are connected to the red, green, blue and sync BNC connectors, sync is automatically routed separately to the H/HV composite sync channel. And, finally if coax cables are connected to red, green, blue and H&V sync channels, sync is automatically routed separately on the H&V channels
- Automatic sync stripping - Strips sync from all three video lines - red, green and blue; required when interfacing to high resolution workstations such as SGI
- Sync polarity tracking - When the input and output signals are both separate H&V, the output sync signal polarities will be the same as the input signal
- Built-in "LCD" and "DLP" signal processing - Works flawlessly with any LCD or DLP based projector
- Flush mounted, metal adjustment pots
- 75 ohm input termination switch

INPUT

Female 9 pin D-sub, universal analog/ECL

OUTPUT

Analog RGBS, RG$_S$B or RGBHV automatically

COMPATIBILITY

● ⋆ Match these symbols to those in section 4 for Extron's analog, ECL compatible computer input cables.

VGA, VESA, SVGA, XGA, PowerPC, MAC II, Quadra, Power MAC, Sun Sparc, SGI, NeXT, DEC, NCD

BANDWIDTH

200 MHz (-3 dB)

OPTIONAL ACCESSORIES

9D-AN-2'	26-319-01	$65.00
T-VGA	26-106-01	$35.00
T-MAC II	26-235-01	$35.00
TC-MFA	26-235-04	$175.00

SPECIFICATIONS

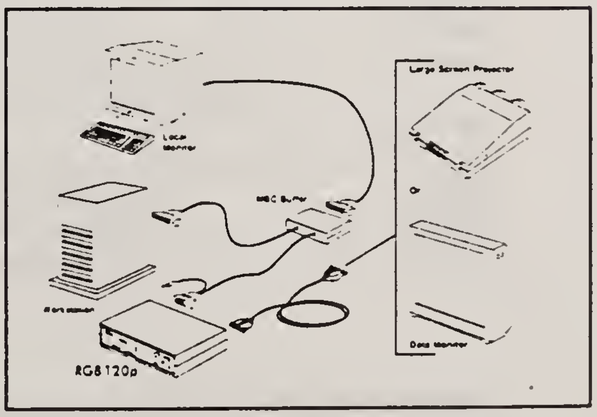
Input signals	
Video	Analog: .5 to 1.2 volts p-p ECL: .8 to 1 volt p-p
Sync	Separate H&V TTL (±) Sync on green Composite sync TTL (-)
Output signals	
Video	Analog: .3 to 1 volt p-p
Sync	Sync on green, composite Sync, separate H&V sync
Frequency compatibility	
Horizontal	15-125 kHz (automatically)
Vertical	30-170 Hz (automatically)
RGB video bandwidth	200 MHz, (-3 dB)
Power supply	
US/Canada version	115 VAC, 60 Hz to15 volt, 800 mA-wall mount
Dimensions	7.7" W X 4.8" D X 1.6" H 19.5 W x 12 D x 4 H cm
Shipping weight	3 lbs. (1.4 kg)
Warranty	Two years, parts & labor

PART NUMBER

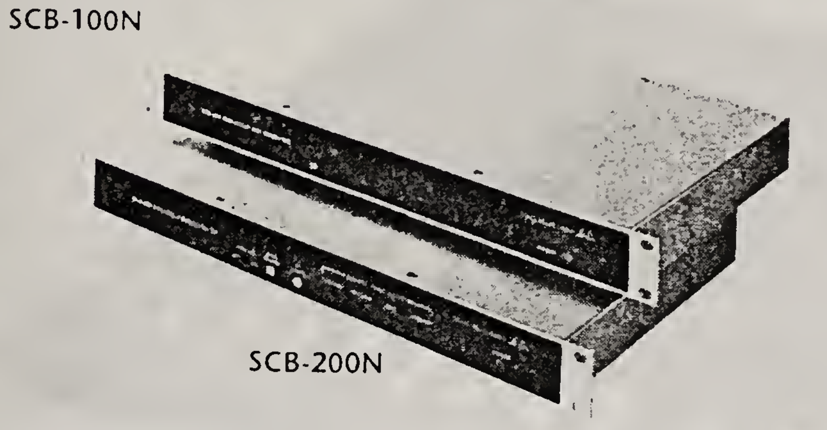
Plastic enclosure

US/Canada version: 60-130-01

List price:
$695.00



Grass Valley



SCB-100/SCB-200 Sync Color Bar Generators

- Quality and reliability are built in to each self-contained 1 RU frame
- Designed for professional and off-line broadcast applications
- Frequency stability and SC/H phase accuracy

SCB-100N Stand-Alone Master Sync/ Color Bar Generator

- Stand-alone NTSC master timing generator ▪ 4 outputs of color black, 2 each of sync, blanking and subcarrier ▪ V1 (Color Frame ID) pulse ▪ Monaural audio tone output ▪ GVG's exclusive encoded subcarrier output allows use of STM-85N source timing modules to simplify system design. $1295.00

SCB-200N Genlockable Master/Source Sync/Color Bar Generator

- Accepts color black or video as a reference ▪ 1 output each is provided of sync, blanking and subcarrier, plus 4 outputs of color black, 1 of which may be user-defined as superblack and 2 of color bars ▪ 1kHz, low impedance balanced output stereo tone generator, locked to vertical timing ▪ Left channel identification is provided with 33ms bursts of increased amplitude ▪ V1 and encoded subcarrier outputs provide simple system integration $1995.00

3240 NTSC Video Processing Amplifier

- High performance units designed for signal processing in studio, master control, remote, satellite downlink and transmitter locations ▪ Full regeneration of sync and burst ▪ Adjustable blanking widths ▪ Soft and hard clippers ▪ Selectable line deletions ▪ Occupies 2 RU, including space for plug-in options ▪ Single power supply is sufficient for any combination of options and may be backed up by second plug-in supply ▪ Optional cable equalization ▪ Each system includes 5 basic modules: ▪ Input module provides clamping, video gain control and separation of luminance, chrominance and sync information ▪ The sync generator and color lock modules regenerate sync and subcarrier from the input video ▪ Output module provides soft and hard clipping, luminance and chrominance recombination, insertion of new sync, color burst and output fanout ▪ External reference module eliminates horizontal picture shifts caused by timing errors at the system input

3240-25 NTSC 2 RU tray, including single power supply, external reference module, module extender and instruction manual.	$6590.00
3240-20 Less external reference module	5550.00

External Reference Module

- Eliminates horizontal picture movement caused by timing errors at the switcher input by providing a constant source of sync and burst at the switcher output ▪ Users may select from 3 operating modes: **Internal:** Sync and burst from input video; **External:** Sync and burst are based on external sync and subcarrier; **Auto:** Automatically switches between external and internal depending on input video timing and external sync showing within a prescribed window
- Parameters for timing coincidence definitions are user-programmable over a wide range $1100.00

Rackmount Remote Control

- Provides control of all processor functions at a maintenance or other remote location ▪ Includes 26' of connecting cable. . . $580.00

Delegate Remote Control

- Used as a remote control panel, unit provides same functions as rack-mount remote control ▪ Panel may be used as a master panel, selectively delegating control functions to a slave panel (rack-mount remote) at a separate location ▪ Includes 3.3' cable, additional cable available as an option $765.00

SYSTEM OPTIONS

Video Automatic Gain Control

- User-programmable to sample single or in any combination, peak video, peak luminance and/or peak sync ▪ Sampling may be examined during: Picture and vertical interval times; picture time only; picture and vertical interval lines which are passed; only vertical interval lines which are passed ▪ Video correction range is ±3 dB $1100.00

NTSC Vertical Interval Reference Automatic Gain Control

- Automatically corrects video gain, chroma gain, burst phase and setup based on input signal ▪ Applications include network receiving points, transmitter input processors and internal level corrections where the VIR signal is present ▪ Front panel reference levels determine the AGC loop setting and are compared to sample signals of chroma level, burst phase, luminance level and setup level during NTSC line 19 VIR ▪ Other lines may be sampled by selecting internal straps ▪ Red LED indicators when the AGC is not operating due to loss of VIR signal, video, or when disabling the AGC either locally or with a remote control panel $1100.00

Relay Bypass Module

- Provides passive signal path to a prime video output in the event of power failure ▪ Operation is either automatic or manual, with an operate/bypass switch on the module or remote from the accessory control panels ▪ LEDs indicate bypass at the elecctronics frame and remote panel $325.00

7510 Series Received-Signal Video Processing Amplifiers

- Automatically switches to internally generated mono-black upon loss of incoming video
- Designed for stabilization of signals received from distant locations, whether by satellite, microwave or landline transmission
- Modular construction makes it economical where mutiple received signals exist ▪ Each module is a complete processing amplifier including: Full regeneration of sync and burst; hard and soft clips; video AGC; selectable vertical blanking widths and cable equalization

7510N	NTSC Video Processor Module with EQ for Belden 8281 cable	$1975.00
7510T1-115	1 RU Tray with 115V Power Supply.	895.00
7510T2-115	2 RU Tray with 115V Power Supply.	1095.00
7500-PSM	Redundant 750 Power Supply Module (115/230V)	335.00

ADDITIONAL PRODUCTS AVAILABLE. PLEASE CALL.

MS1402-VLZ

14 X 2 MICRO SERIES MIC/LINE MIXER

Mackie's MicroSeries 1402-VLZ is a compact mixer that combines the size and durability of the 1202-VLZ with the features and flexibility of the CR1604-VLZ. Like those two mixers, the MS1402-VLZ delivers high headroom and ultra low noise, thanks to its VLZ very low impedance architecture, first introduced on our acclaimed 8•Bus consoles. And it's just as rugged, with all-steel construction, thru-hole-plated fiberglass circuit boards, gold-plated interconnects and sealed rotary controls. The MS1402-VLZ is a distinguished sibling.

Mixing Made Easy

One of the first things you'll notice is that the 1402-VLZ has faders. Like the faders on our SR Series consoles, these 60mm, log-taper faders provide smooth, consistent fades throughout the fader's travel.

3-band EQ at truly useful freqeuncies (80Hz, 2.5kHz and 12kHz) allows for more "musical" equalization. The six studio-grade mic preamps (on channels 1 thru 6) have −129.5dBm E.I.N. And with its integral 48V phantom power supply, the 1402-VLZ is compatible with all of your favorite dynamic and condenser mics. Room rumble, wind noise and mic thumps are cut off on those channels by a Low Cut Filter (75Hz, 18dB/octave), allowing you to use Lo Shelving EQ to enhance the higher end of the bass frequency range (instead of using it to get rid of the aforementioned noises).

Each channel has PFL & In-Place AFL (globally switchable) for solo and cueing flexibility. In PFL you can listen to your channels pre-fade/post-EQ at full level, before the signal reaches the fader and pan control. AFL lets you listen to your channels post-fader/post-EQ. This is great for hearing where the signal is in the stereo horizon (hence the name "Solo In-Place"). Each channel has PFL and

MACKIE.™

CONTRACTORS PRODUCT INFORMATION

RELATED PRODUCTS

RM1402-VLZ RACK MOUNT BRACKETS

MORE INFORMATION

MS1402-VLZ ARCHITECTS' & ENGINEERS' SPECIFICATIONS

■

"IN YOUR FACE" ALL-PRODUCT BROCHURE

FEATURES

- 6 low noise/high headroom XLR mic inputs (−129.6dBm E.I.N.)
- 6 balanced/unbalanced mono line inputs
- 4 balanced/unbalanced stereo line inputs
- 60mm log-taper faders
- 48V phantom power
- 3-Band EQ (12kHz, 2.5kHz, 80Hz)
- Low Cut Filter on channels 1-6
- PFL/AFL (Solo In-Place) on every channel (global)
- Very Low Impedance architecture
- EFX to Monitor switch
- 2 stereo buses
- Alt 3-4 for extra bus
- Balanced inputs and outputs (except RCAs and channel inserts)
- Balanced XLR Main L/R outputs with mic/line level switch
- 1/4" main outputs
- 60dB Gain on chs. 1-4
- Global Aux 1 Pre/Post switch
- Level Setting Marker

MS1402-VLZ

In-Place AFL (globally switchable). PFL Solo also makes level setting easy, especially when used with the new Level Setting Marker and the level-set LED.

Mute/Alt 3–4 on each channel means every channel can be muted. But that's only part of it. Alt 3–4 provides an extra stereo bus for creating two stereo pairs for 4-track recording, or for previewing a source not yet in the main mix. (An engaged mute button sends the channel's signal to the Alt 3-4 outputs.)

EFX to Monitor lets you blend reverb or other effects back into a monitor mix via Aux Send 1, like on our SR Series. There's also an Aux 1 master level control in this section.

Control Room/Phones has its own level control and separate outputs, allowing you to select any combination of Main Mix, Tape In and Alt 3–4. You can create custom headphone mixes, monitor tape levels and more. Plus, a separate switch routes this multi-source signal back into the Main Mix.

Balanced inputs and outputs everywhere (except RCA tape jacks, phones and channel inserts) help keep noise at a minimum, and there are balanced XLR main outputs – as well as 1/4" TRS outs – for direct connections to video post and other such professional equipment. To add still more versatility, the signal at the XLR main outputs is switchable to mic or line level.

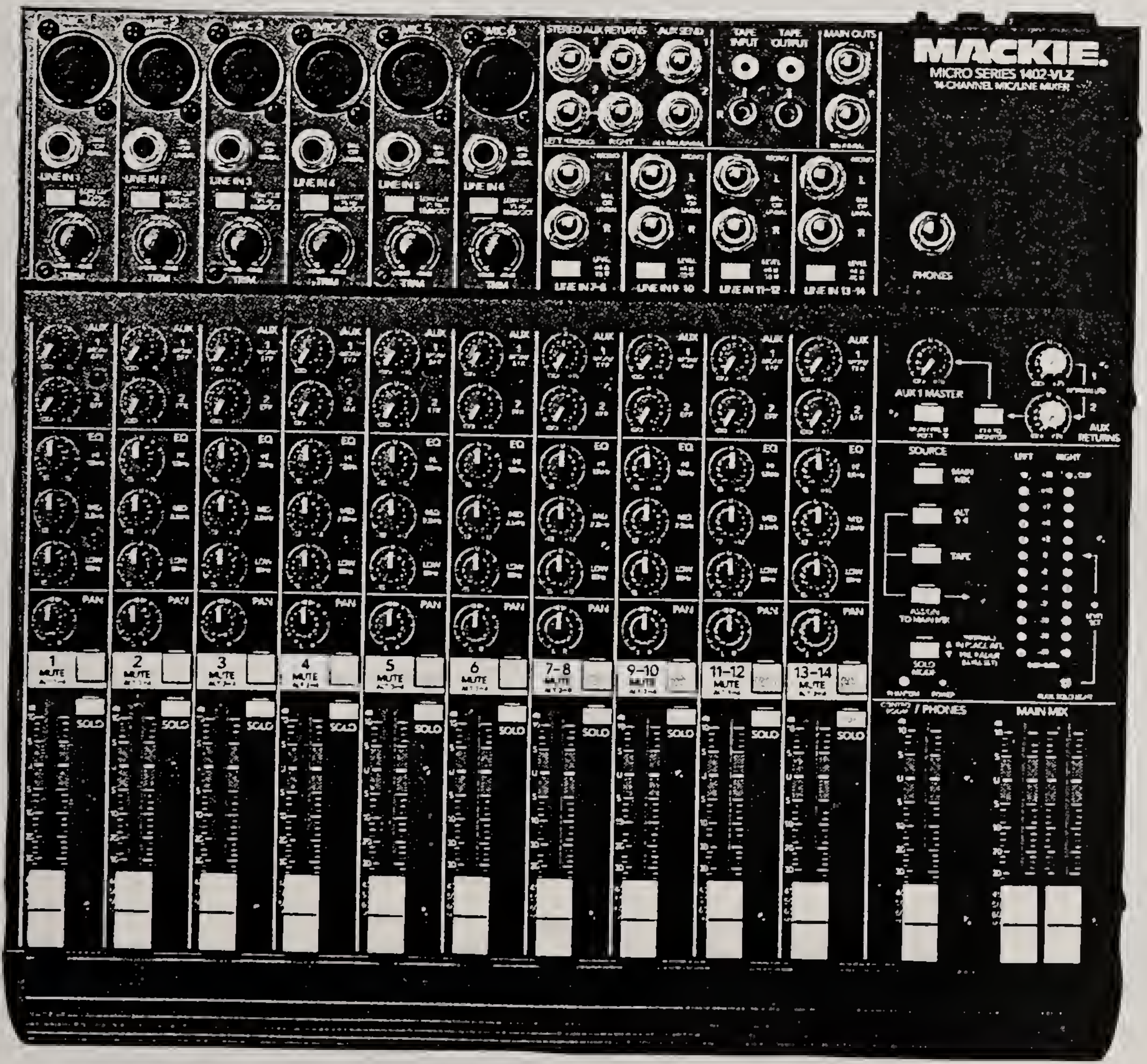
Tough as nails.

The MS1402-VLZ was designed by Greg Mackie, an audio veteran with over 20 years in the industry. His designs are intended for non-stop, 24 hour-a-day professional duty in broadcast and PA applications, TV and radio production studios, and video post suites – places where nothing must ever go wrong. The MS1402-VLZ, like all of Mackie's mixers, lives up to that credo.

It has sealed, co-molded rotary controls instead of open-frame phenolic potentiometers that can suffer from airborne dust and contamination. For the life of an installation, the 1402-VLZ provides minimal rotational contact noise (and if there ever is a problem, pots are individually replaceable). Plus, our combination of mounting, co-molding and energy-absorbing knob design helps prevent impact damage.

Along with its steel chassis and thru-hole-plated fiberglass circuit boards, the MicroSeries 1402-VLZ also features a built-in power supply instead of a "wall wart." Not only does this eliminate the inevitable hassles of dealing with external power supplies, but it also actually reduces hum.

The tiny transformers inside wall warts are typically driven into non-linearity (in excess of 15 kilo-Gauss) to provide enough power for the mixer. This creates stray 25- to 35μV



magnetic fields that are easily picked up by shielded audio cables. The MS1402-VLZ's internal transformer loafs along at under 10 kiloGauss, reducing stray fields to less than 1µV. The MS1402-VLZ also uses the same RF protection circuitry and construction as the CR-1604, making it virtually immune to RF interference in high-energy environments.

Multiple applications.

Our original MicroSeries 1202 has been used continuously in all kinds of applications; with faders and the aforementioned features, the MS1402-VLZ is even more exciting.

Why? Because the MS1402-VLZ – like its heralded ancestor – is able to perform in applications where other small mixers don't measure up:

- ENG mixer
- Sound reinforcement mixer
- Audio mixer for video post editing suites
- Impedance or level matching "toolkit"
- Headphone or cue mixer
- Effects sends sub mixer
- Remote broadcast mixer
- 8-track monitor mixer
- Live film and video sound mixer
- Aux inputs for a larger console

Mackie's MS1402-VLZ has much going for it: compact size, major flexibility and durability make it an incredible mixer value. And of course, its price-to-features ratio make the MicroSeries 1402-VLZ mixer a solid – as well as compact and versatile – investment.

SPECIFICATIONS

Signal-to-Noise Ratio:
90dB, ref. +4dBu
(all channels assigned, panned left/right)

Mic preamp equivalent input noise (E.I.N.):
–129.5dBm @ 150 ohms

Maximum gain (mic in to main out):
86dB (to balanced out)
80dB (to unbalanced out)

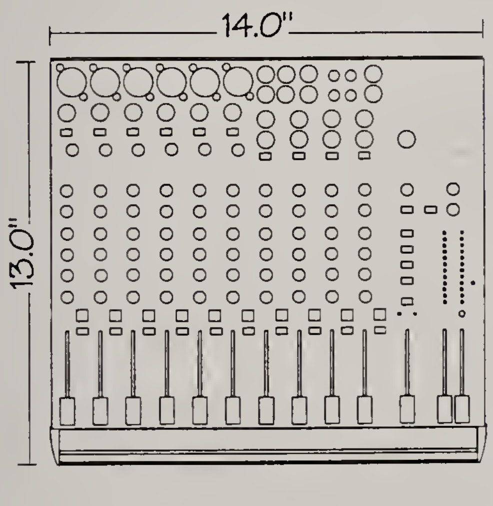
Frequency response:
20Hz to 60kHz, +0/–1dB
(mic input to any output)

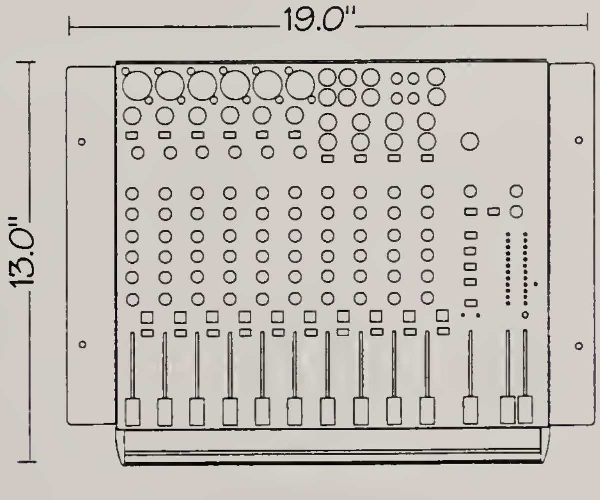
Distortion (THD):
Less than .005% (any output, 1kHz @ +14dBu, 20Hz-20kHz, channel input)

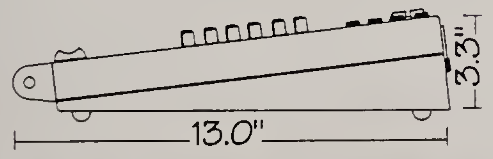
Equalization:
Low: ±15dB @ 80Hz
Mid: ±12dB @ 2.5kHz
Hi: ±15dB @ 12kHz

Maximum output level:
+28dBu balanced
+22dBu unbalanced

Weight:
9.5 lbs. (4.3 kg)



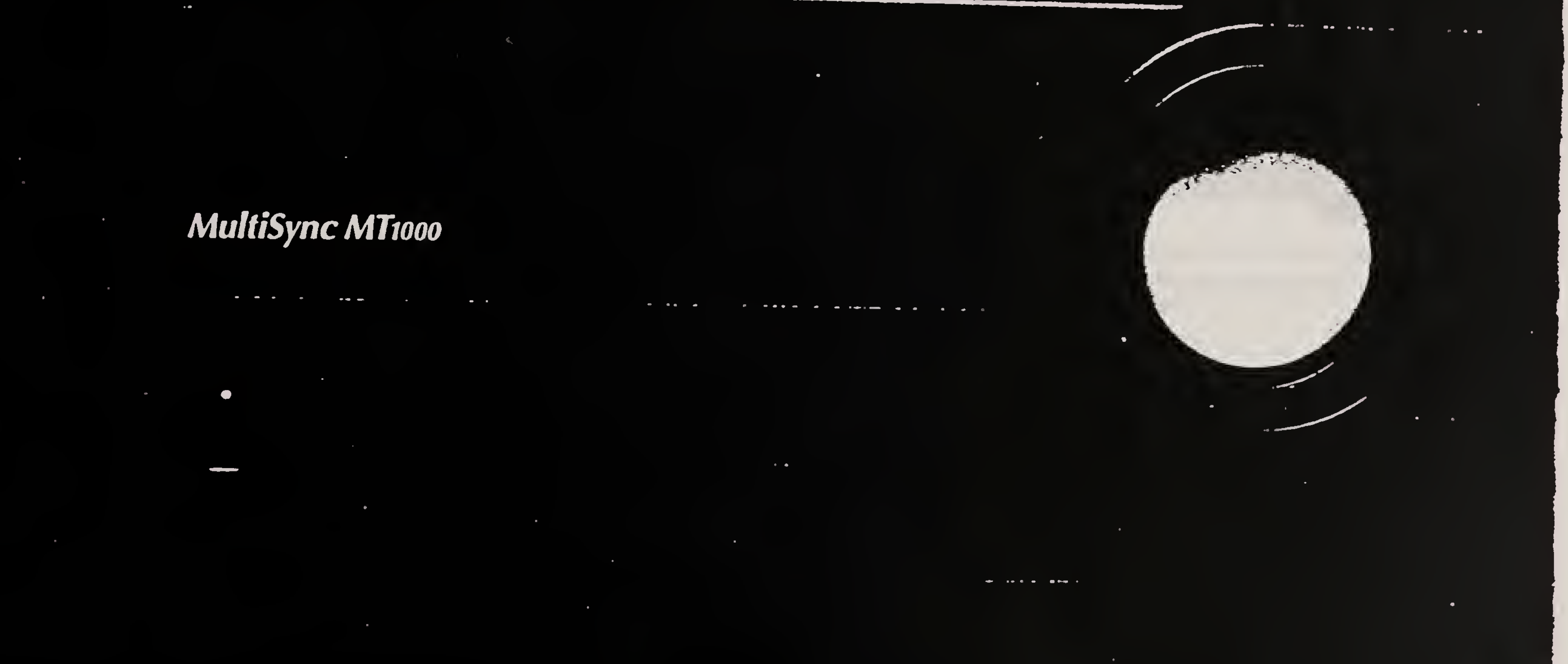




MACKIE DESIGNS INCORPORATED
16220 Wood-Red Rd. NE • Woodinville, WA 98072 USA
Toll-Free 800/258-6883 • FAX 206/487-4337
Outside the U.S., Phone 206/487-4333 • FAX 206/485-1152

NEC Technologies' Multimedia Theatre LCD Projector

T810



MultiSync MT1000

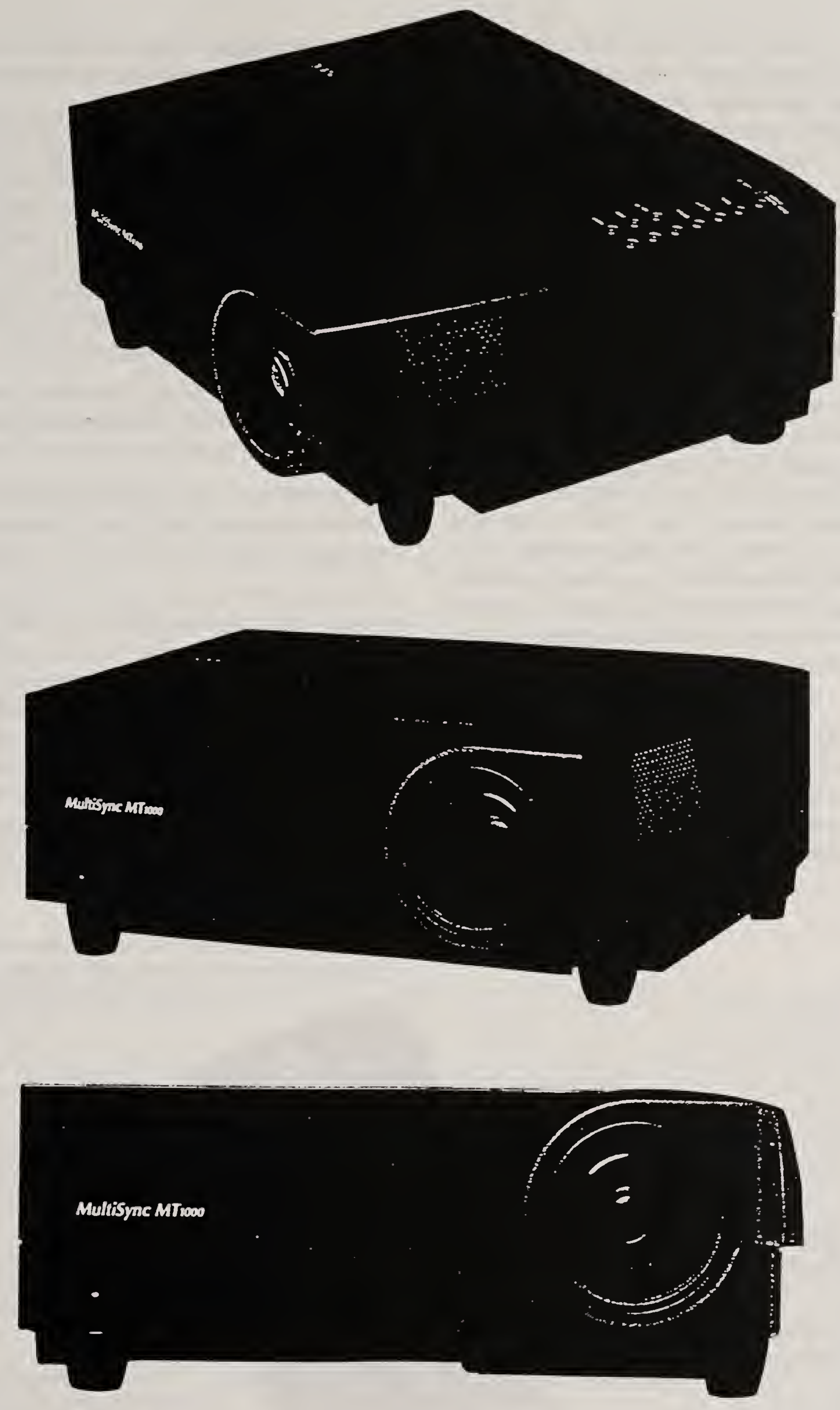
NEC

The MultiSync® MT810™ and MT1000™ LCD projectors provide the powerful, highly portable display solution you need for today's sophisticated presentations.

The presentation standard in business and education is growing ever more sophisticated. As audiences become accustomed to multimedia information displays—including color graphics, motion and sound—today's presenters are challenged to create and deliver engaging presentations that increase attention to and retention of their messages. Whether you're in a presentation facility or on the road, audiences expect excellent image quality and a professional appearance. For these reasons, more and more of the business professionals and educators who must reach today's audiences are discovering the benefits of presenting information digitally—with LCD projectors.

LCD projectors—a better way to present. The strength and versatility of today's presentation software tools make it easier than ever to create a presentation with the impact of color, graphics, motion and sound, store it digitally for future reference and make updates quickly and inexpensively. But once you've created your multimedia presentation, you'll need a display device that will allow you to show it with superior image and sound quality. Moreover, you'll want a display device that's easy to set up and use—a worry-free solution that allows you to focus on delivering your message effectively.

Liquid crystal display (LCD) projectors are the display devices of choice in most business and classroom presentation settings for their image quality and versatility. LCD projectors outperform overhead LCD panels, which require the use of a separate light source and often have a difficult or complicated setup. Most importantly, LCD panels can produce fuzzy, flickering or unevenly illuminated images, diminishing the effectiveness of your presentation. LCD projectors, on the other hand, provide a powerful, self-contained display solution that produces bright, uniform images and has integrated audio capabilities.



The sleek, ergonomic design of the MultiSync MT Series projectors is an asset to any conference room, training facility or classroom.

Presenting the MultiSync MT™ Series LCD projectors. NEC Technologies' latest line of powerful, extremely portable LCD projectors are designed especially for large-screen display needs. The MultiSync MT810 and MT1000 projectors continue NEC Technologies' legacy of outstanding image quality and user-friendly operation in LCD projectors. These full-featured LCD projectors are capable of meeting the mobile and large-screen display requirements of business professionals and educators.

- *MultiSync MT810* This projector is an SVGA (800 x 600) projector designed for sales, marketing and training professionals as well as higher education, school boards and superintendents.
- *MultiSync MT1000* This projector is an XGA (1024 x 768) projector ideal for the display of high-resolution images. This workstation-compatible projector is designed to handle the most demanding needs of high-tech sales, marketing, training and higher education professionals and designers.

Designed to make your life easier. The MultiSync MT810 and MT1000 were designed for remarkable ease of use. They feature an all-in-one remote control that enables quick, one-button access

Easy-to-understand on-screen controls feature callouts that specify exactly which adjustment has been selected. Use the on-screen controls to quickly and easily control virtually every projector function including image adjustments, source selection and speaker controls.

to key features, such as source selection and volume control. The remote control also gives you access to helpful, easy-to-use on-screen controls that can be navigated easily using the integrated mouse:

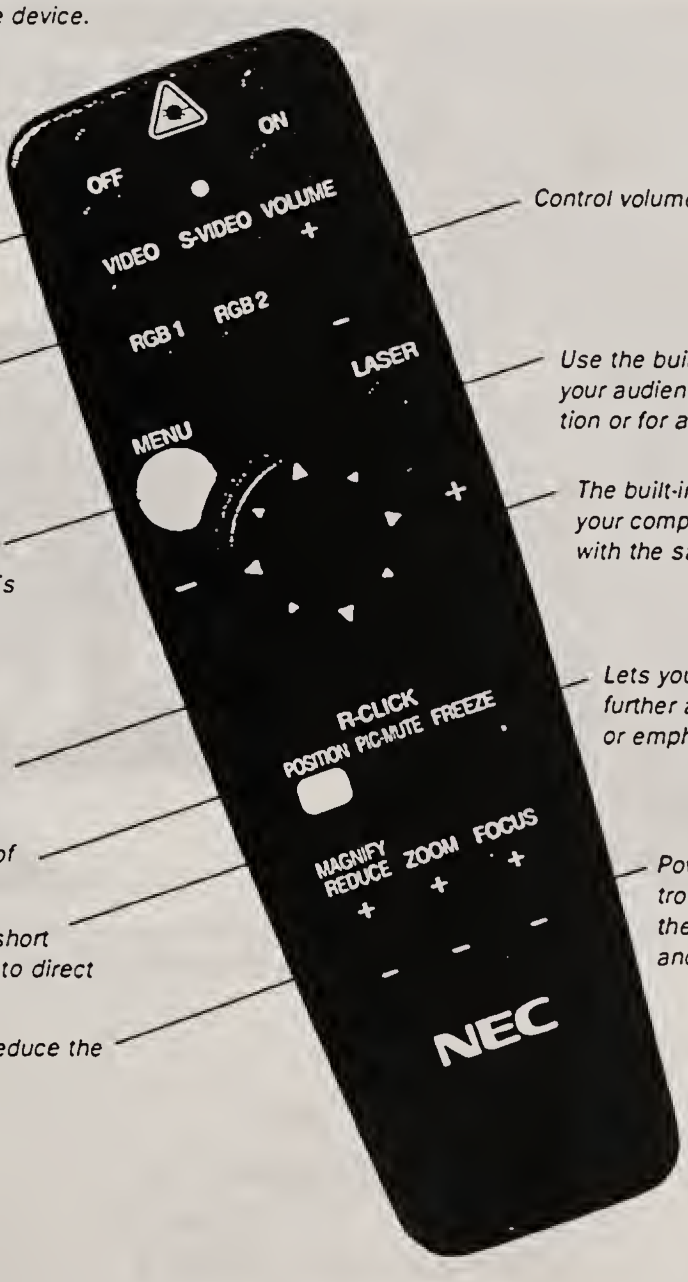
- *Image adjustments* let you adjust brightness, color, contrast, sharpness and position.
- *Customizable display settings* enable you to create and store up to six different settings. With this feature, there's no need to re-adjust your image settings every time a different source is connected. Just plug in the source, call up your customized setting and begin! This feature saves time when you are presenting from two different sources in the same presentation. There's no interruption to re-adjust brightness, contrast and other settings with each source change.
- *Background feature* allows you to store up to eight images (text, graphics or both) in your MultiSync MT Series projector. The images can be used as a backdrop to your presentation, or create a slide show and continuously loop through all eight images. This enables you to quickly display your most-used images without having to access them from your computer.
- *Lamp timer* displays how many hours the lamp has been used, helping you anticipate and manage maintenance of the projector.
- *Language select* allows you to select the language in which the on-screen menus appear. Choose from 6 different languages.

In addition, the remote control enables you to control your computer using the integrated mouse. You can use this to control your presentation software, including launching presentations and advancing slides. You'll enjoy the convenience of using one remote to control both your projector and your presentation. The remote control also includes a built-in laser pointer and a wide angle receiver that lets you use the remote from anywhere in the room. Finally, your MultiSync MT810 or MT1000 projector includes an introductory video to get you up and running fast, with hands-on demonstrations of key features and setup.

The excellent image quality you need to make an impact. The MultiSync MT810 and MT1000 projectors deliver the image quality you expect from NEC Technologies, the leader in display technology. They produce exceptionally bright, focused images with excellent color saturation and contrast. Unlike some projectors that create a "hot spot" of light in the center of the screen and degraded brightness in the edges and corners, the MultiSync MT Series projectors offer evenly illuminated, focused images from edge to edge of the screen for more accurate images and more comfortable viewing. In addition, these projectors create images bright enough to be easily viewed even with the lights on, making them ideal for education and sales settings.

Lightweight and easy to handle for the ultimate in portability. Weighing as little as 15.5 pounds, the MultiSync MT810 and MT1000 projectors are extremely compact in size and weight. Their portability makes it

One wireless remote does it all, allowing you to control your computer-based presentation and the projector with the same easy-to-use device.



Turns the projector on and off

Quickly and easily select your source with the touch of a button

Easily access and scroll through the MultiSync MT's comprehensive on-screen controls

Right mouse click button (left click button on back)

Enables finger-tip control of image position

Turns off the image for a short period of time if you need to direct attention elsewhere

Allows you to magnify or reduce the standard image

Control volume with one-touch simplicity

Use the built-in laser pointer to guide your audience through your presentation or for added emphasis

The built-in mouse lets you control your computer and presentation with the same remote

Lets you freeze your image for further audience clarification or emphasis

Power zoom and focus controls let you focus or adjust the size of your image quickly and easily

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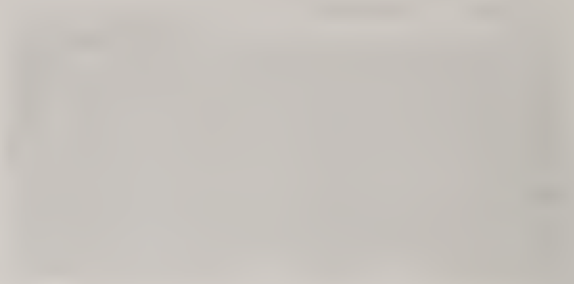

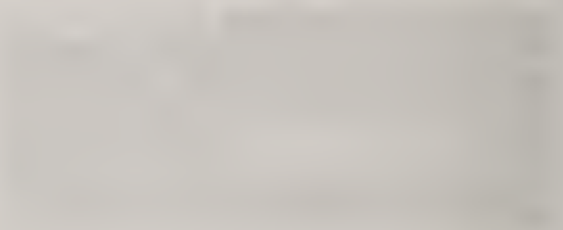

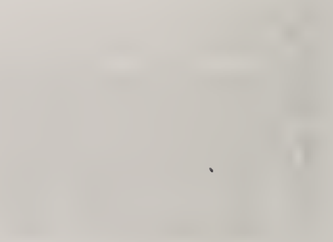

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The lightweight design of the MultiSync MT projectors, as well as an integrated carrying handle, makes them remarkably easy to pick up and transport.

easy to take them on the road for impactful, professional presentations no matter where your business takes you. Because they are so easy to move around, one unit can be used as a shared resource by multiple people in multiple rooms. In addition, the projectors' sturdy construction includes a carrying handle integrated into the unit for ease of transport. Optional carrying cases from NEC Technologies are available to help you take your show on the road—providing added protection and convenience when you transport your MultiSync MT Series projector.

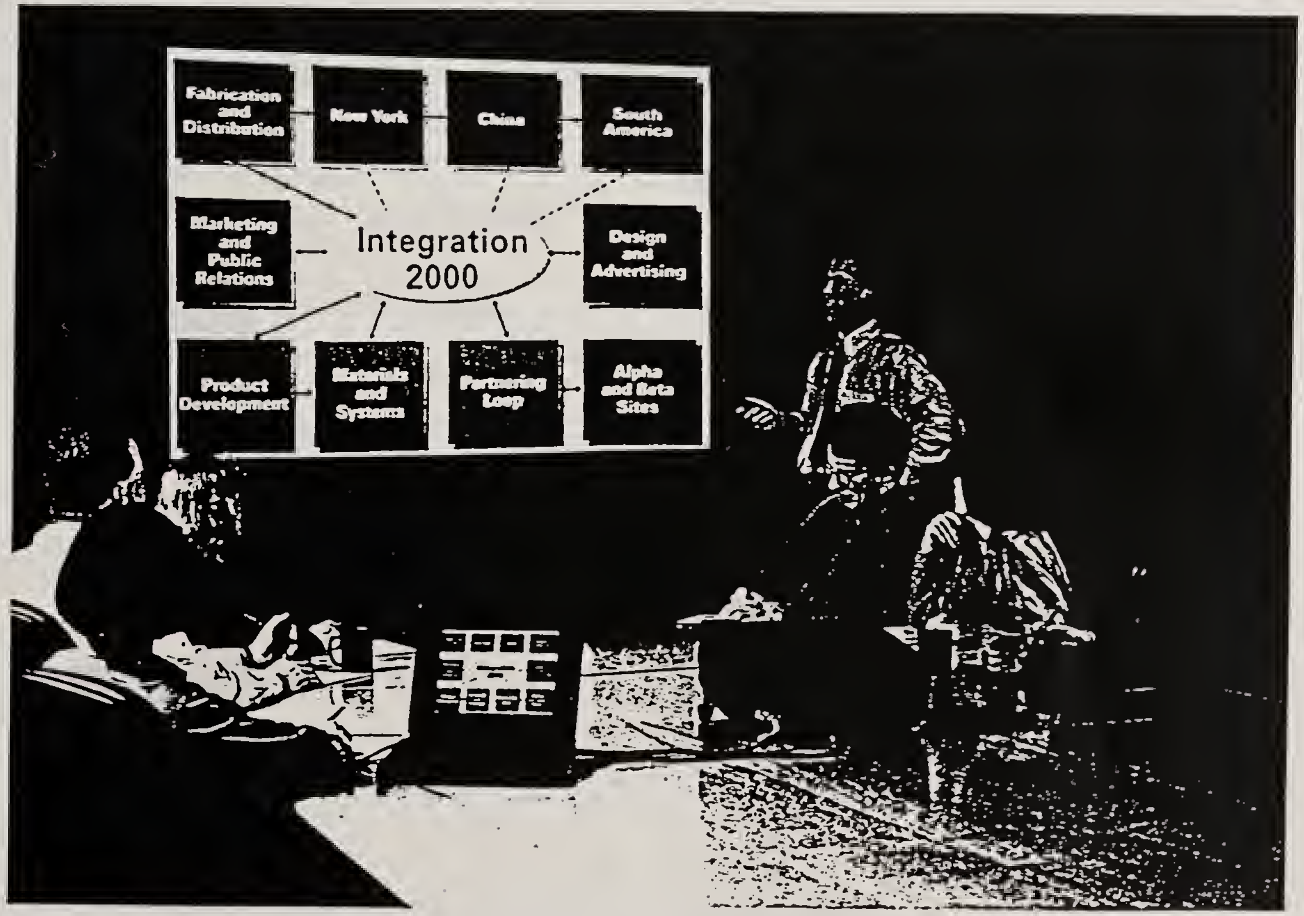
Excellent compatibility ensures usability over the long term. As notebook and laptop computers expand their resolution compatibility, you'll want to make sure your projector is equally capable. The MultiSync MT Series projectors are compatible with virtually any source, including PC and Macintosh[3] computers and laptops including the latest high-resolution XGA models. They are also compatible with video sources including VCRs, laserdisc players and live video cameras.

Connection is quick and easy via a comprehensive, labeled input panel, which includes two separate computer inputs, one video and one S-video input. The included MultiCable[3] connection system enables you to connect both PC and Macintosh[3] computers to your projector. Because one end of the cable is equipped with a PC connector and the other has a Macintosh connector, the same cable can be plugged into either type of computer while the remaining end is plugged into the projector's input panel. Finally, the universal power supply enables global companies to use the same projector model throughout their organizations.

Sleek, ergonomic design looks smart and works smarter. The sleek, sophisticated design of the MultiSync MT810 and MT1000 projectors is an enhancement to any conference room or presentation facility. More importantly, the projectors have been designed with the end user in mind and include several features that improve functionality:

- *An input panel* that's conveniently located and well-labeled.
- *A comprehensive remote* control that enables full projector and computer control.
- *An integrated carrying handle* for ease of transport.
- *Built-in audio capability* that lets you add sound to your presentations without needing to carry around extra equipment. An audio jack is also included, so you can supplement the sound capability of your MultiSync MT Series projector if desired.
- *Optional accessories*—from replacement lamps to carrying cases—that allow you to customize your MultiSync MT Series projector to suit your own needs and preferences.
- *Compatibility with the Kensington[3] security lock system*, which enables you to lock your MultiSync MT Series projector in place for added protection.

The quality and reliability you expect from NEC Technologies—plus an exclusive service guarantee. With NEC Technologies' exclusive InstaCare™ service, you can have the peace of mind of knowing you'll never be stranded with a projector that's not performing. InstaCare guarantees a replacement projector within 24 hours or repairs to an original projector within 72 hours. In addition, NEC Technologies pays for and tracks the shipping of your projector and any replacement projector.

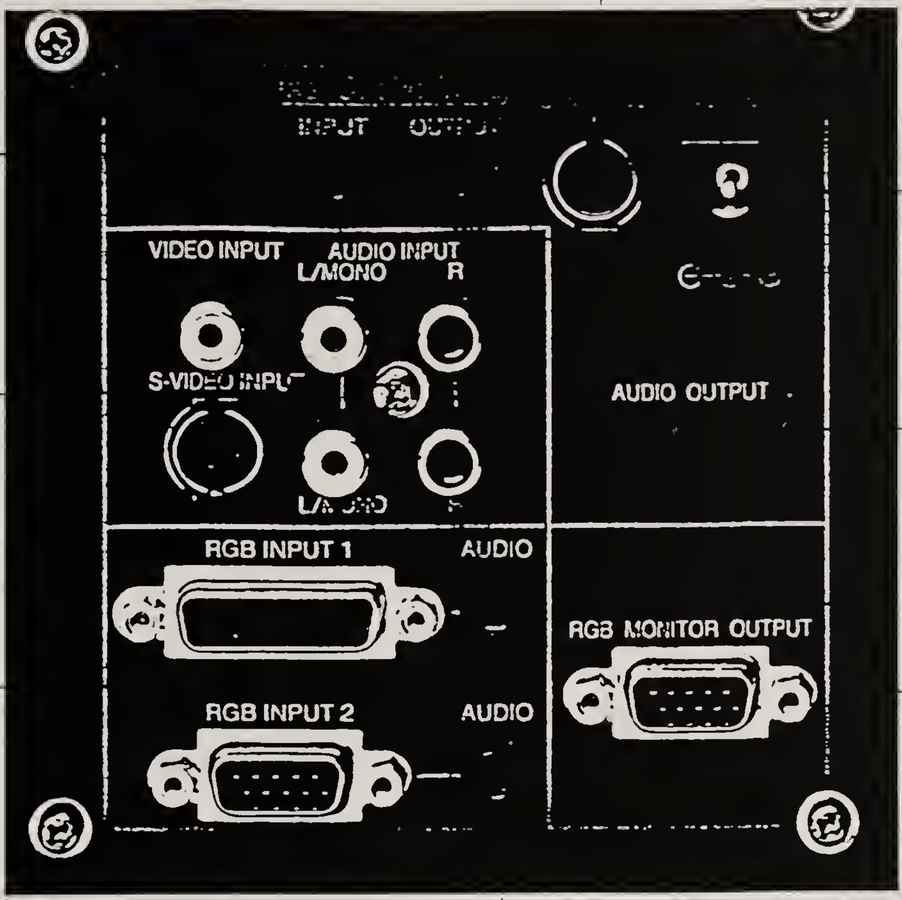


Portability and simple connection to the most widely used sources make it possible to give anyone in your organization the ability to give high impact multimedia presentations.

VMI, INC.
211 WEDDELL DRIVE
SUNNYVALE, CA 94089
PHONE: 408-745-1700

MultiSync MT810 and MT1000 Input Panel

An easy-to-use input panel helps you set up quickly, while multiple inputs let you connect more than one source simultaneously.



The remote control jack lets you use the remote control as a wired device

Video sources such as VCRs, laser disc players and live video cameras are easily connected to the MultiSync MT using the video inputs

Use the RGB inputs to connect PC and Macintosh[3] computers or laptops

The stereo audio connectors for the RGB and video inputs let you take advantage of the sound capability offered by your computer, laptop or video source

The PC control port enables you to control the MultiSync MT using your PC and software

The 12V DC output jack lets you power a laptop computer or other 12V accessory from the MultiSync MT

The stereo audio output jack allows you to supplement the MultiSync MT's built-in speakers with your own external stereo speakers

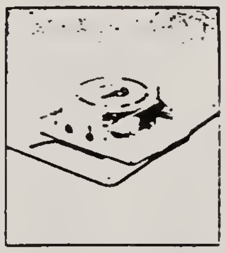
Use the external monitor output to loop your computer image through the projector and display it on an external monitor

MultiSync MT810 and MT1000 Accessories

NEC Technologies offers a full line of accessories designed to complement your MultiSync MT Series projector. From replacement lamps to carrying cases, you'll find what you need to customize your MultiSync MT to suit your needs and preferences.

TownCase 810/1000 Carrying Case
This durable case was designed for local transportation and safe storage. An inside pocket provides additional safe storage for the remote control and IR receiver, plus any cables.

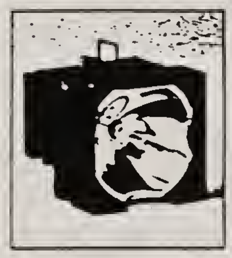
MT Cart
Rugged, collapsible luggage cart can be used with any of the cases for increased mobility.



MT Mount 810/1000
Sturdy, multiple-access ceiling mount kit includes a special feature that lets you perfectly level the MultiSync MT on the ceiling for straight images regardless of ceiling design.

TownCase Plus 810/1000
Offers all the features of the TownCase and the added convenience of a special pocket that holds your notebook computer.

Multimedia Screen 60
Portable display screen measures 60" diagonally and sets up quickly. Durable carrying case included.



Replacement lamp and filter
This user changeable 250-watt metal halide lamp and air filter fits either the MultiSync MT810 or MT1000 projector. NEC recommends lamp replacement after 2,000 hours of use.

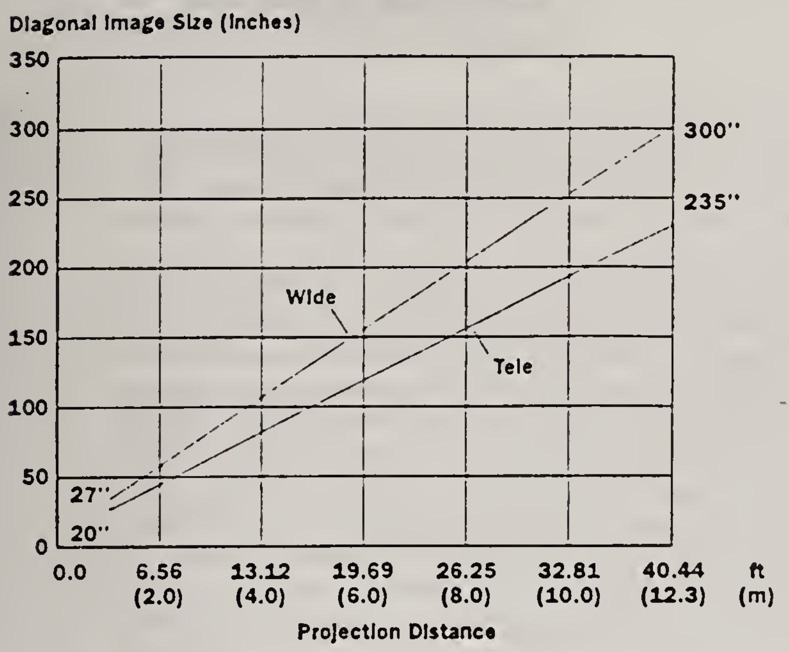
AirCase 810/1000 Shipping Case
This sturdy shipping case features reinforced panels and is ATA-approved for shipping via land carrier or airline. A Federal Express-approved transparent pouch stores shipping labels for added convenience.

MultiCable connection system
Order additional MultiCables for added convenience when connecting Macintosh or PC sources to your MultiSync MT Series projector.

Replacement Remote
Should your remote get lost or damaged, NEC offers an identical replacement remote, complete with IR receiver for computer mouse control.

MultiSync MT810 and MT1000 Throw Distances

This chart illustrates the throw distance to screen size relationship for a variety of set-up options.



Your Visual Systems Division Reseller is:

VMI, INC.
211 WEDDELL DRIVE
SUNNYVALE, CA 94089
PHONE: 408-745-1700

MultiSync MT810 and MT1000 Specifications Model #LCDMT810, LCDMT1000

LCD Panel:	**MT810:** 1.3" (3.3cm) × 3. 800×600 p-Si TFT active-matrix **MT1000:** 1.3" (3.3cm) × 3. 1024×768 p-Si TFT active-matrix
Lens:	Power Zoom, Power Focus, F 2.5 f=52–73mm
Lamp:	Metal halide lamp 250 Watt
Image Size:	Min 20" (48.3cm) Max 300" (118.1cm)
Projection Distance:	Min 3.3 ft (1.0m) Max 39.4 ft (12.0m)
Light Output:	**MT810:** 550 ANSI lumens **MT1000:** 450 ANSI lumens
Contrast Ratio:	Greater than 200:1
Color Reproduction:	16.777,216 colors simultaneously
Color Temperature:	7.500 Degrees Kelvin
Synchronization Range:	**MT810:** Horizontal 15 to 60kHz (non-interlaced) Vertical 50 to 85Hz **MT1000:** Horizontal 15 to 69kHz (non-interlaced) Vertical 50 to 85Hz
RGB	
Input Signals:	Visual: 75 ohm 0.7 Vp-p positive, Sync TTL Audio: 47k ohm 0.4V rms
Input Terminals:	Visual: 15pin Mini D-SUB, 15 pin standard D-SUB Audio: Stereo Mini Jack
Output Terminals:	Visual: RGB Throughout Audio: Stereo Mini Jack
PC Compatibility	
640×480:	**MT810:** 60, 72, 75 and 85Hz vertical refresh **MT1000:** 60, 72, 75 and 85Hz vertical refresh
800×600:	**MT810:** 56 to 75 and 85Hz vertical refresh **MT1000:** 56 to 75 and 85Hz vertical refresh
1024×768:	**MT810:** (compressed) **MT1000:** 60, 70, 72, 75 and 85Hz vertical refresh
1280x1024:	**MT810:** not applicable **MT1000:** (compressed)
Macintosh Compatibility	
640×480:	**MT810:** 60 and 67Hz vertical refresh **MT1000:** 60 and 67Hz vertical refresh
832x624:	**MT810:** (compressed) **MT1000:** 75Hz vertical refresh

Video	
Input Signals:	Visual: S-Video Y: 75 ohm 1.0Vp-p, S: 75 ohm 0.28Vp-p Audio: 47k ohm 0.4V rms
Input Terminals:	Visual: RCA Audio: RCA × 2
Horizontal Resolution:	NTSC 550 lines PAL/SECAM/NTSC 4.43 350 lines
Video Compatibility:	NTSC/PAL/SECAM/NTSC 4.43
Audio:	Built-in stereo speakers (1.0w × 2. 8 ohm)
Remote Control Functions:	Computer Mouse Control with left and right click buttons, Built-in Laser Pointer, Source Selection, Volume, Zoom, Focus Picture Magnification, Position, Picture Freeze, Picture Mute
On-screen Controls	
Source Selection Menu:	Video, S-Video, RGB 1, RGB 2
Image Adjust Menu:	Volume, Brightness, Contrast, Color, Tint, Sharpness, Image Mode, H Position, V Position, Auto Picture, Picture Adjust, Fine Picture Adjust
Power Menu:	Lamp Timer, Auto Start, Power Management
Settings Menu:	Custom Memory, Image Loop, Backdrop, Set Position, Language Select, Reset
Fan Noise:	Less than 42dB
Power Requirement:	110–120v/220–240v AC, 50Hz/60Hz
Power Consumption:	**MT810:** 370W, **MT1000:** 390W
Dimensions: W×H×D	15.6"×5.7"×12.6" (39.6cm×14.5cm×32.0cm)
Net Weight:	**MT810:** 15.5lbs. (7.0Kg) **MT1000:** 15.9lbs. (7.2Kg)
Supplied Accessories:	Wired/Wireless Remote Control with wireless mouse and laser pointer, Infrared Receiver with built-in PC/Mac driver and cables, MultiCable, Power Cable, Remote Cable, Introductory Video, User's Manual, Registration Card
Safety and Regulation:	FCC: Class "A" UL: 1950 CSA
Environmental Considerations:	Temperature: 32–104°F (0–40°C), operational Humidity: 20–80%, operational
Warranty:	**MT:** 2 year limited, parts and labor including InstaCare 24 hour replacement service **Lamp:** 2000 hours or 6 months, whichever comes first

All specifications are the same for both products unless otherwise noted.

For the location of the MultiSync MT dealer nearest you or for more information on MultiSync MT accessories, call **1-800-NEC-INFO.**

To speak to a MultiSync MT customer service representative, call **1-800-836-0655.**

To visit our World Wide Web home page, dial-in to the Internet at **http://www.nec.com.**

For more information on MultiSync presentation products via fax, call NEC **FastFacts** at **1-800-366-0476** and request MultiSync product catalog #1.

Expect more. Experience more.

NEC Technologies, Inc. 1250 N. Arlington Heights Rd., Suite 500
Itasca, Illinois 60143-1248

NEC

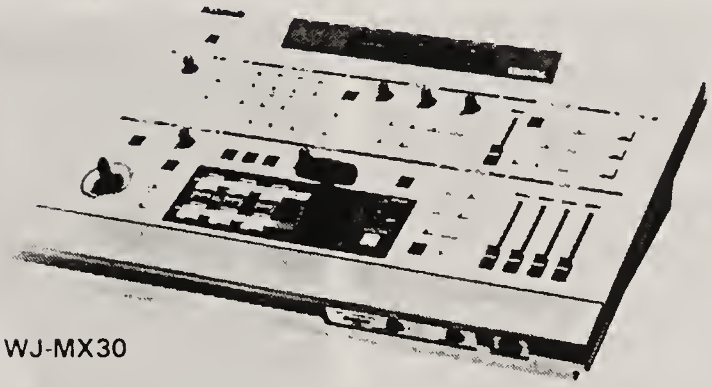
Panasonic
Broadcast & Television Systems Company

AUDIO/VIDEO MIXERS/ CHARACTER GENERATORS

WJ-MX30 Digital A/V Mixer

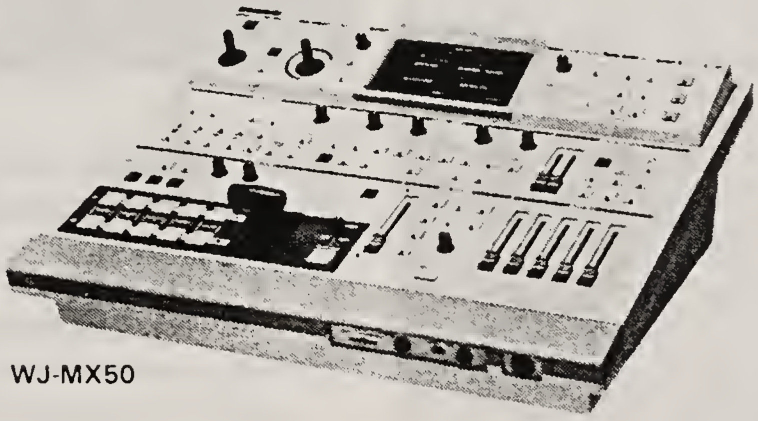
• 2-channel digital field synchronization • Allows special effects in each of the A/B program buses • 3-step picture in picture • Digital effects include: 62 steps strobe, still, mosaic/scramble, negative, paint, mono, AV synchro • 108 wipe patterns • Wipe/mix section • Fade-in/fade-out • Downstream key with 8-color matte generator • 3 sources plus matte generator can be switched, any 2 of them routed to the program buses • A/B program buses can be monitored at the A/B program outputs while the mixed picture is monitored at the preview output • Color correction • Audio mixing with audio-follow or breakaway capability • Master recording output can be selected at the Effect switch in the Program Out section • External remote control input for RS-232C serial control • GPI input • Compatible with WJ-KB15 and WJ-KB50 character generators.

WJ-MX30	$2650.00
WV-KB12A Full keyboard titler with scroll	230.00


WJ-MX30

WJ-MX50 Professional Digital A/V Mixer

• 2-channel digital frame synchronization permits special effects in each of the A/B program buses • 4 sources can be switched and any 2 of them routed to the program buses • A/B program buses can be monitored at the A/B program outputs while the mixed picture is monitored at the preview output • The master recording output can be selected at the effect switch in the program out section • Compatible with a wide variety of video editing devices • GPI input


WJ-MX50

Other features:

• RS-232C connection: it is possible to program more wipe patterns by combining external wipe pattern control numbers assigned with zoom, scroll, multi, blinds, pairing, multi and pairing and other operating mode details • RS-422 connection: numbers 1-099 wipe pattern can be accessed from AG-A800 optional Multi-event Edit Controller. Maximum accessible number via RS-422 is 255. An additional 32 wipe patterns can be operated manually on the WJ-MX50 • Digital special effects: 62 steps strobe, still, frame, mosaic, negative, paint (posterization), mono, multi ($^{1}/_{4}$, $^{1}/_{9}$ or $^{1}/_{16}$ screen), trail and AV synchro (any combination of 6 of the digital visual effects can be programmed to trigger with selected levels of the accompanying audio) • 287 wipe patterns: combination of 7 basic patterns and other effects can create 287 patterns. Basic wipe patterns: multi wipe, pairing, wipe edge decoration (blinds), compression, slide, H/V aspect, wipe boundary effects, joystick positioner, wipe direction • Wipe/mix section: non-additive mix (NAM); B-bus luminance key/line chroma key; when luminance key is selected, low-luminance portions of the picture are cut off and mixed with the A-bus video; when chroma key is selected it is possible to address the colors in the B-bus video to be cut off and mixed with the A-bus video; automatic A/B roll (auto take); audio follow • Fade-in/fade-out: video/title/audio individually or synchronously faded; fade to/from white/black/black color/A-bus/B-bus; automatic fade run (auto fade) • Downstream key: selectable sources: character generator, A-bus, B-bus, external camera; key level control adjusts pattern sensing level; reverse switch permits interchanging patterns high and low; selectable 8-color matte generator to the DSK; edge effects; connection with optional WJ-KB50 and WJ-KB15 character generators • Automatic programmable effects: incorporates 8 separate memories; serial switching of events 1-8 using auto take or GPI trigger; effect run transition control is available • Color correction • Audio mixing capability

WJ-MX50	$6300.00

WJ-KB50 Character Generator

• Designed to operate with the WJ-MX50 and WJ-MX30 digital A/V mixers • Character size: 4 levels (horizontal) x 4 levels (vertical), adjustment on an individual line is available • 5 language modes: English, German, French, Spanish, Italian • Scrolling: P1-P10, up/down/to right/to left • Crawl mode (single-line scrolling); upper/lower, from right to left • Fonts: Gothic/Roman normal/Roman Italic • Wipe/window wipe functions • Date/time/stopwatch functions

WJ-KB50	$690.00

WJ-KB15 Character Generator

• Random access key selections • When the WJ-KB15 is connected with the WJ-MX30 or WJ-MX50 digital A/V mixers, the following functions/operations are possible: 9 pages of character displays and a scroll feature for versatile program productions; 1 page (page A) of character display with date and time display capability; stopwatch with lap time; title positioning feature

WJ-KB15	$360.00

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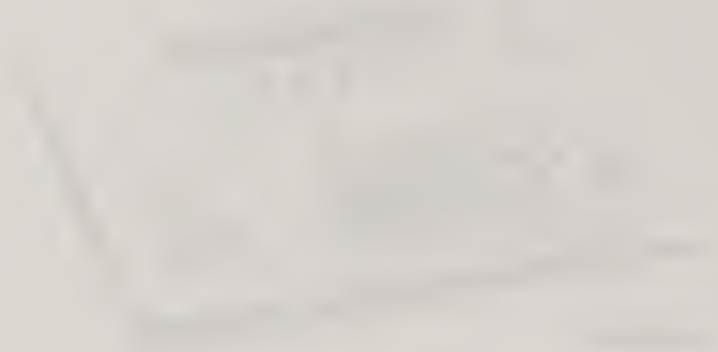

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CameraMan

System II

3-CCD General Pan/Tilt Camera Systems™

Visibly Better. With Higher Resolution And More Accurate Color.

CPT-2013-A3N(A3P) CPT-2017-A3N(A3P)

For a broadcast-quality camera system that offers maximum performance and value, look no further than ParkerVision's 3-CCD CameraMan® product line.

ParkerVision's 3-CCD Camera Systems have all the functionality of our popular 1-CCD Camera Systems, but with added features, higher resolution and more accurate color for those applications which require higher-performance. Our 3-CCD Camera Systems incorporate newly developed 1/2-inch IT Power HAD™ CCDs with 380,000 effective picture elements. This improved HAD sensor structure drastically reduces smear level by 20dB while attaining a high sensitivity of F9.5 at 2000 lux. This permits high quality images in difficult lighting conditions.

A remarkably high horizontal resolution of 750 TV lines is achieved with the high packing density of these CCD image sensors and their accurate Spatial Offsetting. The combination of this CCD technology, improved electronic circuitry, and advanced video processing results in an excellent signal-to-noise ratio of 60dB. White balance control is available through manual R/B gain adjust and R/B paint adjust, Auto White Balance and Auto Tracing White Balance.

The CameraMan provides advanced camera control functions such as linear matrix, shading compensation, master pedestal, gamma selection, selectable knee position and detail level. All control functions are available through CamraMan SHOT Director™, or wireless Digital RF-900™ remote control interface options.

Camera Design

- High-resolution camera with 750 TV lines.
- Choice of 13x or 17x zoom lens.
- Faster pan/tilt speeds and a wider movement range than other pan/tilt cameras.
- NTSC (or PAL) with composite, RGB, analog component or S-Video output for higher quality video.
- WhisperDRIVE Plus™ for quiet operation.
- Optional features such as autoTRACK™ technology give presenters the freedom to walk around the room while the camera automatically follows every move.
- RS-232 interface for additional camera control capabilities.
- RS-485 communications capability for multiple-camera applications.

Location Preset Features

- More location presets than any other integrated camera system (125 to be exact).
- ±.125° location preset accuracy puts the camera right where you want it, every time.
- Location presets can store a pan/tilt position, zoom perspective, focus, and IMAGE™ setting.
- Location presets can be stored and recalled via the wireless Digital RF-900™ Keypad, or CameraMan SHOT Director™ options.

Future Expandability

- Expand your camera system as your needs grow, leveraging your initial investment.
- The 3-CCD Camera System can expand to a Student Camera System™,Personal Locator System™, Presenter Camera System™, and Deluxe Camera Systems™ designed for advanced systems applications (see back for upgrade package information).

Also Available in

- 1-CCD camera systems.
- PAL camera systems (CPT-2013-A3P and CPT-2017-A3P).

Why CameraMan 3-CCD Camera System?

ParkerVision's 3-CCD CameraMan Product Line offers the latest in 3-CCD imaging technology providing for higher resolution, better color reproduction, improved optics and control over basic camera functions.

For these features available only from ParkerVision:

- Integrated 3-CCD Pan/Tilt Camera System.
- WhisperDRIVE Plus™ for quiet operation.
- Camera control via wireless, hard-wired, or software interface.
- Field-installable upgrade packages that allow you to expand the capabilities of your 3-CCD General Pan/Tilt Camera System.

Optional Features Include

- autoTRACK™ Capability With Wireless Audio.
- Wireless Digital RF-900™ camera control keypad.
- CameraMan Shot Director™ for control of up to 16 cameras from one control unit.

For more information, or a product demonstration, contact us at:

8493 Baymeadows Way
Jacksonville, FL 32256-9886
904-737-1367, or
800-532-8034, or
904-731-0958 fax, or
parkerv@southeast.net email

PARKERVISION®
Visibly Better.™

visit our website at http://www.parkervision.com

Visibly Better. With Higher Resolution And More Accurate Color.

3-CCD Camera System Specifications

Specifications for NTSC and PAL are the same, unless otherwise noted.

Image Sensor:	1/2"IT (Interline Transfer Power HAD) CCD (x3)
CCD Integration Mode:	Frame/Field Selectable
Picture Elements:	NTSC: 768 (H) x 494 (V) PAL: 752 (H) x 582 (V)
CPT-2013-A3N(A3P)	
Lens (13x):	13x Zoom; f = 7.5 to 97.5 mm
Angle of View(13x Lens)	46.2° x 35.6° @ 7.5 mm 3.8° x 2.8° @ 97.5 mm
Minimum Rel. Aperture:	1:1.4 @ 7.5-80.3 mm 1:1.7 @ 97.5 mm
Image Format	6.4 x 4.8 mm (Dia. 8 mm)
CPT-2017-A3N(A3P)	
Lens (17x):	17x Zoom; f = 7 to 119 mm
Angle of View (17x Lens)`	49.1° x 37.8° @ 7 mm 3.08° x 2.31° @ 119 mm
Minimum Rel. Aperture:	1:1.4 @ 7-96 mm 1:1.7 @ 119 mm
Image Format	6.4 x 4.8 mm (Dia. 8 mm)
Hor. Resolution:	750 TV Lines
Min. Illumination:	5 lux F1.4
Sensitivity:	NTSC: F9.5 at 2000 lux PAL: F8.5 at 2000 lux
S/N Ratio:	NTSC: 60 dB PAL: 58 dB

Gamma Control:	ON/OFF Switchable
Gain Control:	AGC/0 to 18 dB Selectable
CCD Iris Control:	ON/OFF Selectable
White Balance:	Auto/Manual (R/B Gain), ATW Selectable
Linear Matrix:	ON/OFF Switchable
Electronic Shutter Speed (sec):	NTSC: Adjustable in the range of 1/10,000 to about 8.5 second. PAL: Adjustable in the range of 1/10,000 to about 10 second.
Image Control:	Auto or Manual
Mechanical Drives:	WhisperDRIVE Plus™ Rated For 5000 Hrs. Of Continuous Motion
Tilt:	± 25° (Speed: 1°/Sec to 50°/Sec)
Pan:	359° (Speed: 1°/Sec to 45°/Sec)
Location Presets:	125 Via RS-232 Control Or With Optional Wireless Digital RF-900™ Keypad or Windows™ Interface Software
Location Preset Accuracy:	±.125°
Video Out (75 ohm):	NTSC BNC: 1.0Vp-p, Sync Negative Y: 1.0 Vp-p Sync RGB: 0.7Vp-p (9-pin D) R-Y: 0.7 Vp-p B-Y: 0.7 Vp-p

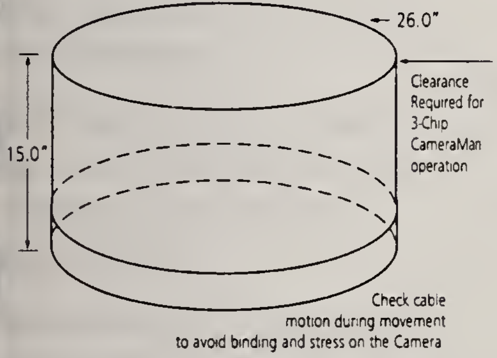
RS-232 Port.	DB-9(F) Connector
RS-485 Port:	Bus Up To 16 Cameras (4 pos. RJ handset port)
Power:	100-240VAC Power Supply 100 W Maximum Consumption
Genlock:	VBS lock (F range: 3.58Mhz+50Hz)
Phase Control:	H/SC Phase Control
Knee:	1/2 Switchable
Scanning System:	NTSC: 2:1 Interlaced, 525 Lines PAL: 2:1 interlaced, 625 lines
Temperature	32° to 100°F (0°-37.78° C)
Humidity:	0 to 95% Non-condensing
Dimensions:	US: 9.25"L x 12.75"W x 10.75"H INT: 23.5cmL x 32.38cmW x 27.31cmH

Optional Wireless Digital RF-900™ Keypad Control

Wireless Mode	
RF Range:	60 Ft. (18.28m) From Camera (Typical)
Power:	(2) AA DURACELL® Battery
Hard-Wired Mode	
Range:	250 Ft. (76.2 m) From Camera (Typical)
Power:	Supplied Through Cable
Dimensions:	7.0"L x 2.20"W x 0.85"H

- For 1-CCD specifications, see "1-CCD General Pan/Tilt Camera Systems" brochure, or contact ParkerVision.

3-CCD Camera System Clearances



Future Expandability

The following upgrade packages will expand the capabilities of your 3-CCD General Pan/Tilt Camera System, adding the functionalities of our other CameraMan Camera Systems.

This Upgrade Package Number:	Adds the Capabilities of:	Which is used for:
• CSC-2300-U	Student Camera System	Distance Learning, classroom settings.
• CPC-2300-U	Presenter Camera System	Video Presentations where the camera needs to follow the presenter via autoTRACK™ technology.
• CPL-2300-U	Personal Locator Camera System	Video Conferences where participants can control the camera's movements.
• CPX-2300-U	Deluxe Camera System	Video Communications where both camera tracking and participant control are needed.

ParkerVision Studio Products

The **CameraManSTUDIO™** (left) gives one person the ability to control multiple cameras, digital video and audio effects, teleprompting, external machines, chroma-keying– all from one graphical user interface.

The **CameraMan SHOT Director™** (below) allows hands-on control of up to 16 cameras from one location.

The **CameraMan SHOT Director PLUS™** (left) is the ultimate image controller, integrating expert camera automation and tracking, video switching, blackburst outputs and CCU functionality into one integrated unit.

The **CameraMan SCRIPT Viewer™** (left) is an interactive teleprompting system controlled via on-screen software, or by the talent with wireless remote control.

PARKERVISION®
Visibly Better.™

Literature Part- LS3CCDST1

CameraMan SHOT Director

Visibly Better. With Multi-Camera CCU And Pan/Tilt Control

JSC-2000 JSC-2100

ut total control of the studio nvironment right in your hands, with the ameraMan® SHOT Director, from arkerVision®.

his one fully integrated unit gives you verything you need to operate and adjust up o 16 CameraMan cameras. Now you can run fully functional, multi-camera studio with ss equipment and manpower than ever efore.

CU Design

Integrated design lets you adjust, and store the CCU settings on up to 16 separate cameras from one location.

On-the-fly LCD Controls can be used to adjust each camera's CCU settings without compromising the on-screen video image.

LCD menus provide real-time camera status indicators for each camera.

asy Operation

Clean, easy-to-use interface makes camera control more efficient.

RS-485 serial communication allows the Shot Director to communicate with up to 16 cameras on a single, daisy-chained 4-conductor cable.

Patented autoTRACK™ technology allows one camera to follow the talent, while you perate the others manually.

Speed-adjustable joystick pan, tilt, and zoom gives you greater control over the camera's movement.

Auto Iris automatically adjusts the camera's RIS and GAIN to maintain a constant video evel

Rotary focus control allows you to adjust he lens' focal point for sharpness and efinition.

Features

- Compatible with both 1-CCD and 3-CCD CameraMan Systems.
- Store and recall up to 125 location presets per camera (99 for 1-CCD cameras) using the numeric keypad and controls.
- Choose one of the five factory-installed autoTRACK Views™, or store and recall 10 additional custom Views.
- autoTRACK Views™ store parameters that define the subject's position on-screen while the camera is in tracking mode.
- Customize the pan and tilt direction for each camera to simplify operations in a multi-camera application.
- SHOT Director is compatible with existing CameraMan camera systems, and is the first in ParkerVision's CameraManSTUDIO™ product line.

Why CameraMan SHOT Director?

For comprehensive camera control and adjustment these features available only from ParkerVision:

- Pan, tilt, zoom, focus and CCU control of up to 16 cameras by one person, from one controller, in one location.
- Available autoTRACK technology.
- Backlit LCD display for easy reading, on-the-fly control, and real-time camera status.
- Compatibility with all CameraMan 1-CCD and 3-CCD camera systems.
- Inter-camera distances of up to 2500 feet (762.2 meters).
- First in ParkerVision's line of CameraManSTUDIO™ products.

For more information, or a product demonstration, contact us at:

8493 Baymeadows Way
Jacksonville, FL 32256-9886
904-737-1367, or
800-532-8034, or
904-731-0958 fax, or
parkerv@southeast.net email

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visit our website at http://www.parkervision.com

Visibly Better. With Multi-Camera CCU And Pan/Tilt Control

CameraMan SHOT Director Specifications and Information

Specifications:

Dimensions:	L: 18 in (45.72 cm) H: 5.5 in (13.97 cm) D: 8.5 in (21.59 cm)
Weight:	4.5 lbs (2.04 kg)
Display Type:	160x80 STN LCD with backlight
Display Dimensions:	H:1.5 in (3.81 cm) W:3 in (7.62 cm)

Communication:

RS-485 Ports:	In/Out
RS-485 Connector:	Modular handset (4-conductor)
RS-485 Distance:	2500' (762.2 m) Max
RS-232 Connector:	DB9 Female
RS-232 Distance:	50' (15.2 m) Max

Electrical:

AC Power:	US: 100-240 VAC, 50/60Hz, 100W INT: 120 VAC, 60Hz, 100W
DC Power:	18-20 VDC

Environmental:

Temperature Range:	32°- 100° F (0°-37.78° C)
Humidity Range:	0-95% Non-condensing

Controls:

Pan/Tilt/Zoom:	Three-axis self-centering joystick, software configures speed proportional to adjustment of control (1-CCD single speed zoom)
Iris/Focus:	Rotary encoders, speed proportional to adjustment of control.
Speed:	Slider Pot
Other:	• Four Menu-defined softkeys • Five autoTRACK View buttons • Front-panel push-button power switch with illuminated indicator. • Auto Iris switch with illuminated indicator.

Real-Time Status Indicators:

- Pan in Degrees
- Tilt in Degrees
- Zoom position
- Focus Position
- Iris Position
- Gain Setting

Adjustable Functions:

- Pan/Tilt Direction
- Pan/Tilt Limits
- Maximum Pan/Tilt Speed
- Maximum Zoom Speed
- Store and Recall Location Presets
- Location Preset Speed
- Color Bars On/Off (3-CCD)
- LCD Contrast
- LCD Brightness

Camera Adjustments (3-CCD cameras):

- Detail
- Knee
- White Balance
- Pedestal
- Red/Blue Paint
- Red/Blue Gain
- Automatic Exposure Window
- Shutter Speed
- Linear Matrix
- Color Temperature
- Gamma
- G. Sync
- D-Sub Configuration
- Shade
- Horizontal Phase
- Sub-Carrier Phase/Fine

JSC 2100 Model:

- Instant autoTRACK switch
- autoTRACK Window adjustment
- autoTRACK Subject Position
- Store and Recall autoTRACK Views

Upgrade Kits:

CameraMan systems not purchased with SHOT Director may require an upgrade kit to be compatible with the SHOT Director. Call your authorized ParkerVision reseller or ParkerVision Regional Sales Coordinator for more upgrade information.

Warranty:

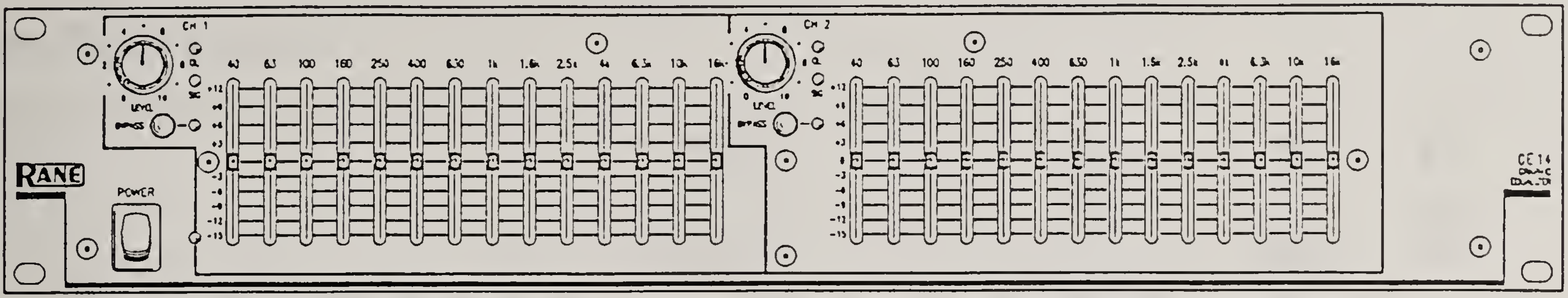
Standard ParkerVision Warranty- One year parts and labor.

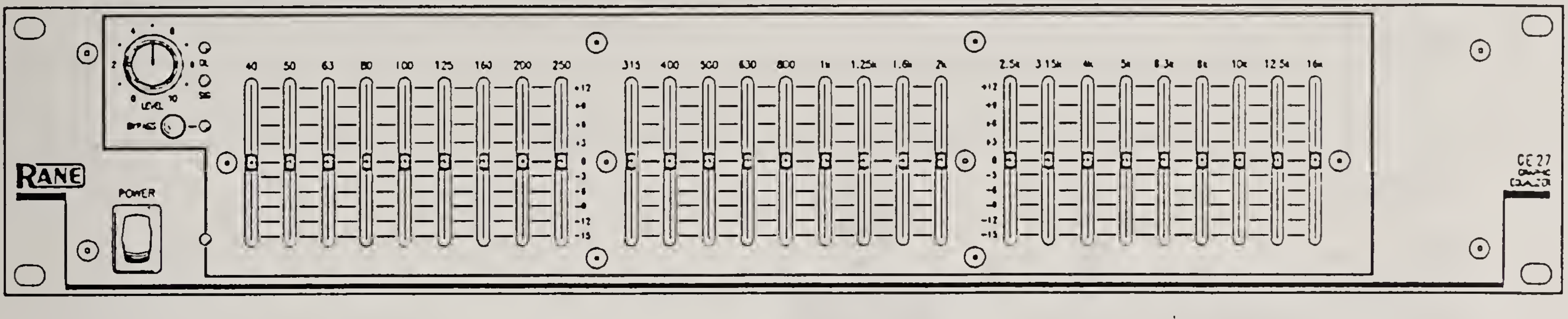
PARKERVISION®
Visibly Better.™

RANE Professional Audio Product Data Sheet

GE 14 & GE 27

GRAPHIC EQUALIZERS





GE Series Constant-Q Graphic Equalizers

General Description

The Rane GE Series Constant-Q Graphic Equalizers consists of the GE 14, a 2-channel, 14-band, 2/3-octave design, and the GE 27, a single channel, 27-band, 1/3-octave version. Housed in two rack-space units, these equalizers feature long throw, high resolution slide controls on each band, ensuring good resolution over its extended boost/cut range of +12dB to -15dB.

The active filter sections are of the constant bandwidth (constant-Q) variety. The bandwidth of each individual filter is guaranteed to be narrow enough to prevent unwarranted interaction between filters, yet wide enough to produce exactly the type of correction curve demanded by even the most unusual acoustic surroundings. This differs dramatically from conventional designs of the past encumbered with the unfortunate characteristic of changing bandwidth with changing boost/cut amounts.

Front panel controls and indicators include an overall gain control for each channel as well as signal present and overload indicators. The rear of the unit provides a 1/4" Tip-Ring-Sleeve connector for inputs and outputs. The inputs are fully actively balanced, the tip is the positive input, the ring negative and the sleeve is signal ground. Unbalanced sources may be connected to the GE series through the use of either "mono" 1/4" connectors or by tying the ring to the sleeve on TRS type plugs. The outputs are active unbalanced.

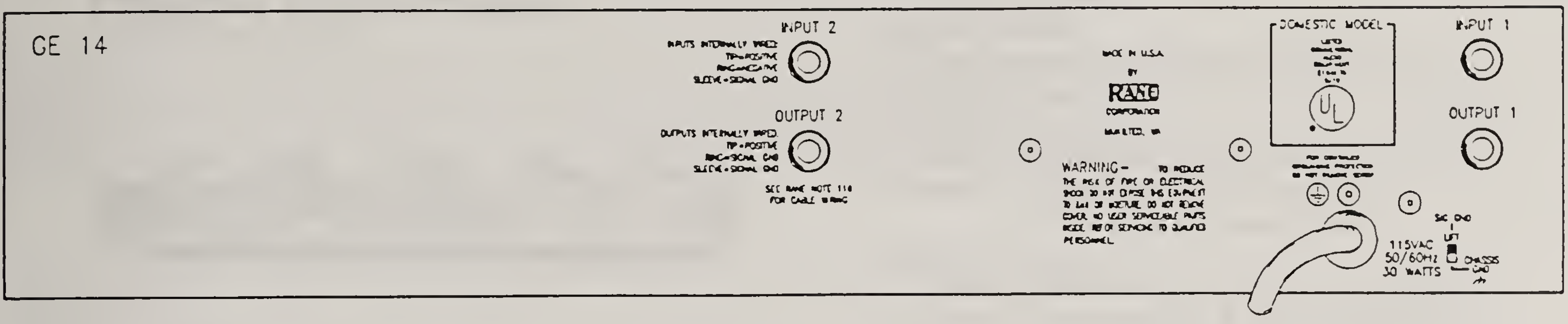
Please consult the references cited on the back for additional details.

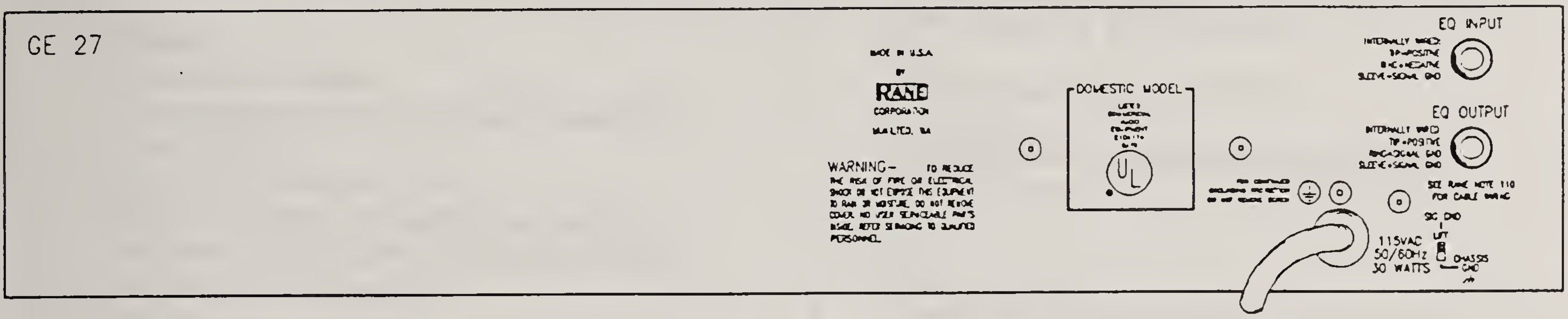
Features

- GE 14: (2) 14-BAND, 2/3-OCTAVE CHANNELS
- GE 27: (1) 27-BAND, 1/3-OCTAVE CHANNEL
- CONSTANT-Q BANDWIDTH DESIGN
- 1/4" TRS CONNECTORS
- OVERALL LEVEL CONTROLS
- PASSIVE BYPASS SWITCHES
- 45mm FILTER SLIDE CONTROLS
- +12, -15dB BOOST/CUT RANGE
- GROUNDED CENTER-DETENTS
- OVERLOAD INDICATORS
- SIGNAL PRESENT INDICATORS
- SUBSONIC FILTERS
- ULTRASONIC FILTERS
- RFI FILTERS

Now
UL
Listed!

Rear Panel Details





Architectural Specifications

The graphic equalizer shall be of constant-Q design to minimize interactions between adjacent bands, and contain frequency bands located on standard ISO center frequencies. Each band shall have a bandwidth of either 1/3- or 2/3-octave, as specified elsewhere. A boost range of +12dB and a cut range of -15dB shall be provided. A detented and positively grounded 0dB point shall be provided on 45mm linear sliders with dust dams.

A rotary overall level control shall be provided with a range from off to +6dB of gain.

The inputs shall be active balanced/unbalanced designs terminated with 1/4" TRS (tip-ring-sleeve) connectors. The outputs shall be active unbalanced with equal output impedances (line & ground) terminated with 1/4" TRS connectors. RFI filters shall be provided. Transient On/Off relay muting shall be provided. The unit shall provide a passive Bypass feature requiring no power to operate. Subsonic and ultrasonic filters shall be built-in. LEDs shall be provided to indicate Overload and Signal Present conditions.

The unit shall be capable of operation by means of its own built-in power supply connected to 120VAC (240VAC where applicable). The unit shall be entirely constructed from cold-rolled steel.

The unit shall be a Rane Corporation GE Series Constant-Q Graphic Equalizer.

Available Accessories

- SC 3.5 Security Cover

References

1. D. Bohn, "Constant-Q Graphic Equalizers," *Rane Note 101*, (1982).
2. D. Bohn, "A New Generation of Filters," *Sound and Video Contractor*, vol. 2, pp. 36-39 (Feb. 1984).
3. T. Pennington, "Constant-Q," *Studio Sound*, vol.27, pp. 82-85 (Oct. 1985).
4. D. Bohn, "Constant-Q Graphic Equalizers," *J. Audio Eng. Soc.*, vol. 34, pp. 611-626 (September 1986).
5. D. Bohn, "Exposing Equalizer Mythology," *Rane Note 115*, (1986).

FREQUENCY AGILE (TUNEABLE) PRODUCTS

Model 9270
Frequency Agile Modulator
SCIENTIFIC-ATLANTA

Features
- Full frequency agility
- Video delay pre-distortion network meets FCC requirements
- SAW vestigial sideband filter
- Meets FCC offset and stability requirements
- All spurious outputs >60 dB below video carrier
- 4.5 MHz audio carrier input
- BTSC stereo compatible
- +60 dBmV output

The 9270 television modulator design specifications allow combining multiple agile channels in a single headend and continued delivery of high system performance. The convenient size and user-accessible controls provide for easy installation.

The 9270 provides excellent differential gain and phase response. It meets FCC delay predistortion requirements and offers excellent group delay characteristics. Front panel adjustments and rear panel access to signal switching mean maximum convenience of operation.

Specifications
Video
Input level for 87.5% modulation
0.7 V p-p minimum

Input level range w/video AGC for 87.5% modulation
0.5-2.0 V p-p

Input type
baseband video-negative sync

Frequency response
±1.0 dB (30 Hz to 4.2 MHz)

Input impedance
75 Ohms

Video S/N (CCIR 421-3 weighting)
>65 dB minimum

Differential gain
<3% @ 87.5% modulation

Differential phase
<2° @ 87.5% modulation

Audio
Input level
-10 dBm @ 1 kHz for 25 kHz deviation minimum

Input level range
-10 to +10 dBm

Input impedance
600 Ohms balanced (field modifiable to Hi-Z bridging input)

Frequency response
mono: ±0.5 dB from 30 Hz to 15 kHz
stereo: ±0.5 dB from 30 Hz to 105 kHz
±0.1 dB from 50 Hz to 50 kHz

Harmonic distortion
<0.5% (30 Hz to 105 kHz @ 25 kHz deviation)
<0.5% (15 kHz to 50 kHz @ 50 kHz deviation)

Hum and noise (monaural)
>40 dB down @ 25 kHz deviation

BTSC
25 kHz peak deviation (±0.2 dB)

Pre-emphasis
75 microsecond (disabled by internal jumper for BTSC input)

RF
Frequency range
54-450 MHz, any EIA channel in low, mid, high, superband and hyperband

Output impedance
75 Ohms, unbalanced

Output level:
+50 dBmV to +60 dBmV

Video carrier level
+40 to +50 dBmV, continuously variable

Sound carrier level
-10 to -20 dBc, continuously variable

Output return loss
>16 dB min.

Video carrier frequency tolerance (nominal)
standard: EIA channel frequency +12.5 kHz
stability: ±5.0 kHz relative to nominal frequency (maximum for 1 year)

Spurious outputs
>55 dB below video carrier

Output test point
-20 dB ±2 dB

Mechanical
Operating temperature
32°F to 122°F

Power requirements
105-125 VAC, 60 Hz, 23 watts

Dimensions
1.75" H x 19" W x 15" D

Weight
10 lbs. max.

ANTEC No. SCI 134933 Mfg. No. 9270

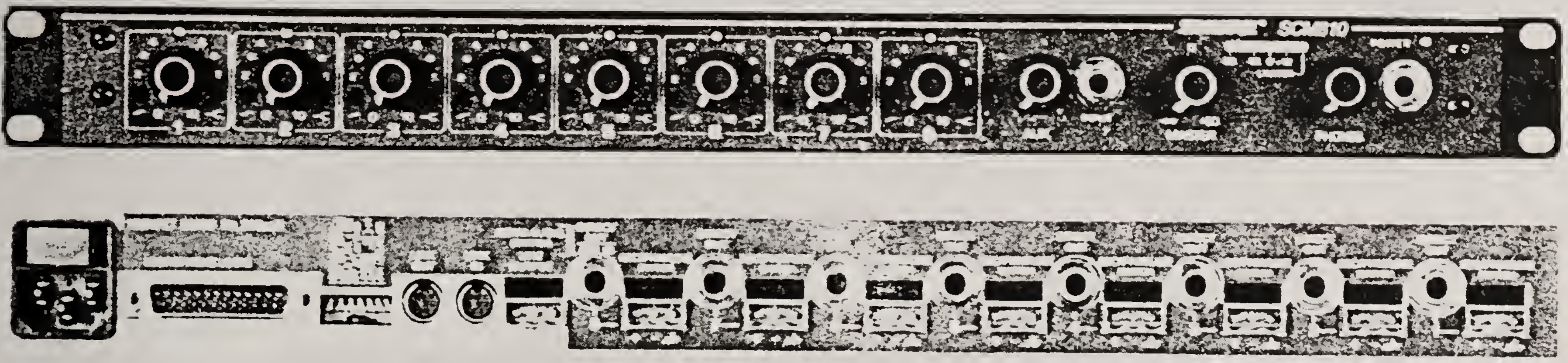
ANTEC N0. SCI 146258 Mfg. No. 379548
dual IF loop retrofit kit for adding DIFL-A or DIFL-B to 9270 modulator

SHURE®

Shure Brothers Incorporated
222 Hartrey Avenue
Evanston IL 60202-3696 U.S.A.

Models SCM810 and SCM810E User Guide

AUTOMATIC MICROPHONE MIXER



DESCRIPTION

The Shure Model SCM810 is an automatic microphone mixer using Shure's patented Intellimix® operational concept. Intellimix activates only those microphones being addressed, minimizing the poor audio caused by multiple open microphones. The SCM810 is an eight-channel mixer capable of being linked for installations as large as 400 input channels. The single-rack-height chassis is ideal for installations with limited rack space. The removable header-type input and output connectors are quick, convenient, and eliminate the time and expense of wiring XLR microphone connectors.

Each automatic input channel has a two-band equalizer. Equalization is useful to reduce unwanted low-frequency audio pickup, as well as to make different microphone types—lavaliers, boundary and handheld—sound similar. Each input channel has three associated logic terminals: Gate Out, Mute In, and Override In. These connections provide for activation of external devices and external microphone control, important for specialized installed sound applications. Each mixer channel also has a $^{1}/_{4}$-inch phone jack for use as a direct output, gated channel output, send/receive insert point, or external speech gate for mixing consoles.

The SCM810 has numerous applications in sound reinforcement, audio recording, and broadcast. In any speech pickup application where multiple microphones are required, the SCM810 dramatically improves audio quality. Automatic operation allows an individual talker's voice to rise above background noise and reverberation to become clearer and more intelligible.

Each SCM810 handles up to eight microphone- or line-level signals and two aux-level signals. Any high quality, low-impedance, balanced dynamic or condenser microphone (including wireless) can be used. Additional SCM810 mixers (up to 50) can be interconnected using the rear-panel link jacks. Non-automatic (manual) operation is also available.

The SCM810 is supplied with:

- Rack-mounting hardware
- A link cable for linking SCM810 mixers
- Removable block terminal connectors

The SCM810 is designed for 120 Vac operation and its line cord contains a standard 3-pin grounded ac plug. The SCM810E is designed for 230 Vac operation and its line cord contains a CEE 7/7 ("Schuko") plug. An accessory rack panel adapter to convert the removable block input and output connectors to XLR connectors, and aux connectors to phono jacks is available as RKC800.

FEATURES

- Reliable, quick-acting, noise-free microphone selection which automatically adjusts to changes in background room noise
- User-configurable parameters for automatic operation
- Automatic gain adjustment as additional microphones are activated (NOMA: Number of Open Microphones Attenuator)
- Last Mic Lock-On circuit maintains ambient sound
- Adjustable EQ per channel: low-frequency rolloff and high-frequency shelving
- 48 V phantom power selectable for each input
- Active balanced microphone- and line-level inputs and line-level output
- Highly RF-resistant chassis and circuitry
- Bi-color LED indication of channel activation and clipping
- Linking capability for systems up to 400 microphones
- Non-automatic aux-level inputs with level control
- Front-panel headphones output with level control
- Peak-responding output limiter with selectable thresholds and LED indicator
- Internal modification permits 120 V operation (SCM810) or 230 V operation (SCM810E)
- SCM810: Underwriters Laboratories Listed and Canadian Standards Association listed as Certified; SCM810E: Conforms to European Union directives, eligible to bear CE marking; VDE GS-Certified to EN 60 950; meets European Union EMC Immunity Requirements (EN 50 082–1, 1992): RF radiated (IEC 801–3): meets Criterion A, ESD (IEC 801–2): meets Criterion B, EFT (IEC 801–4): meets Criterion B

NOTE

Unlike Shure's AMS system of dedicated microphones and mixers, the SCM810 is recommended for use with any professional-quality low-impedance microphone or line-level signal.

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CE

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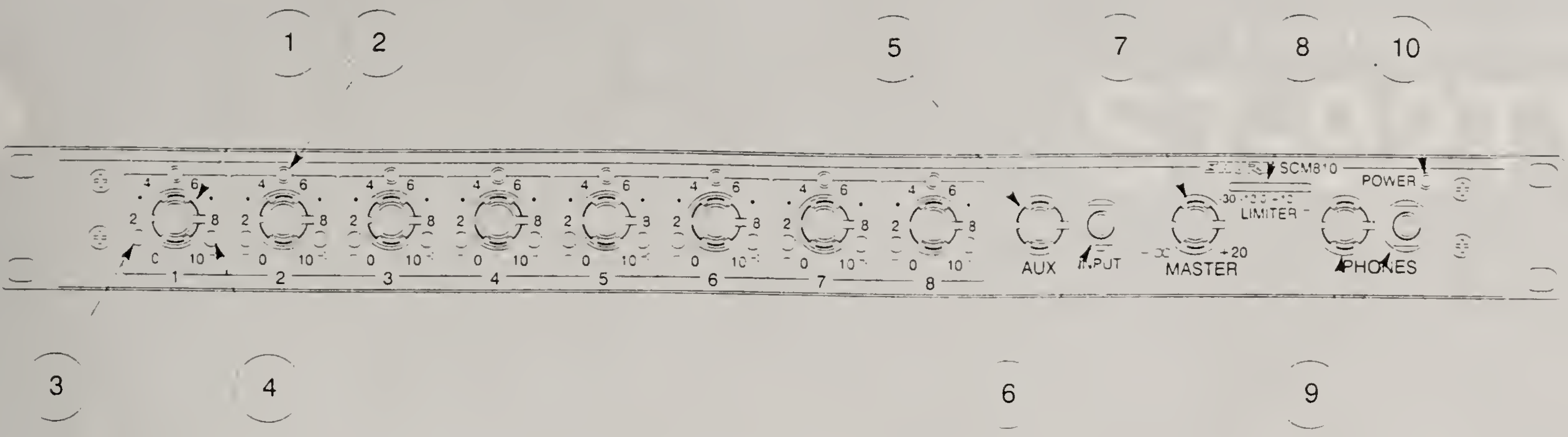


MODEL SCM810 FRONT PANEL
FIGURE 1

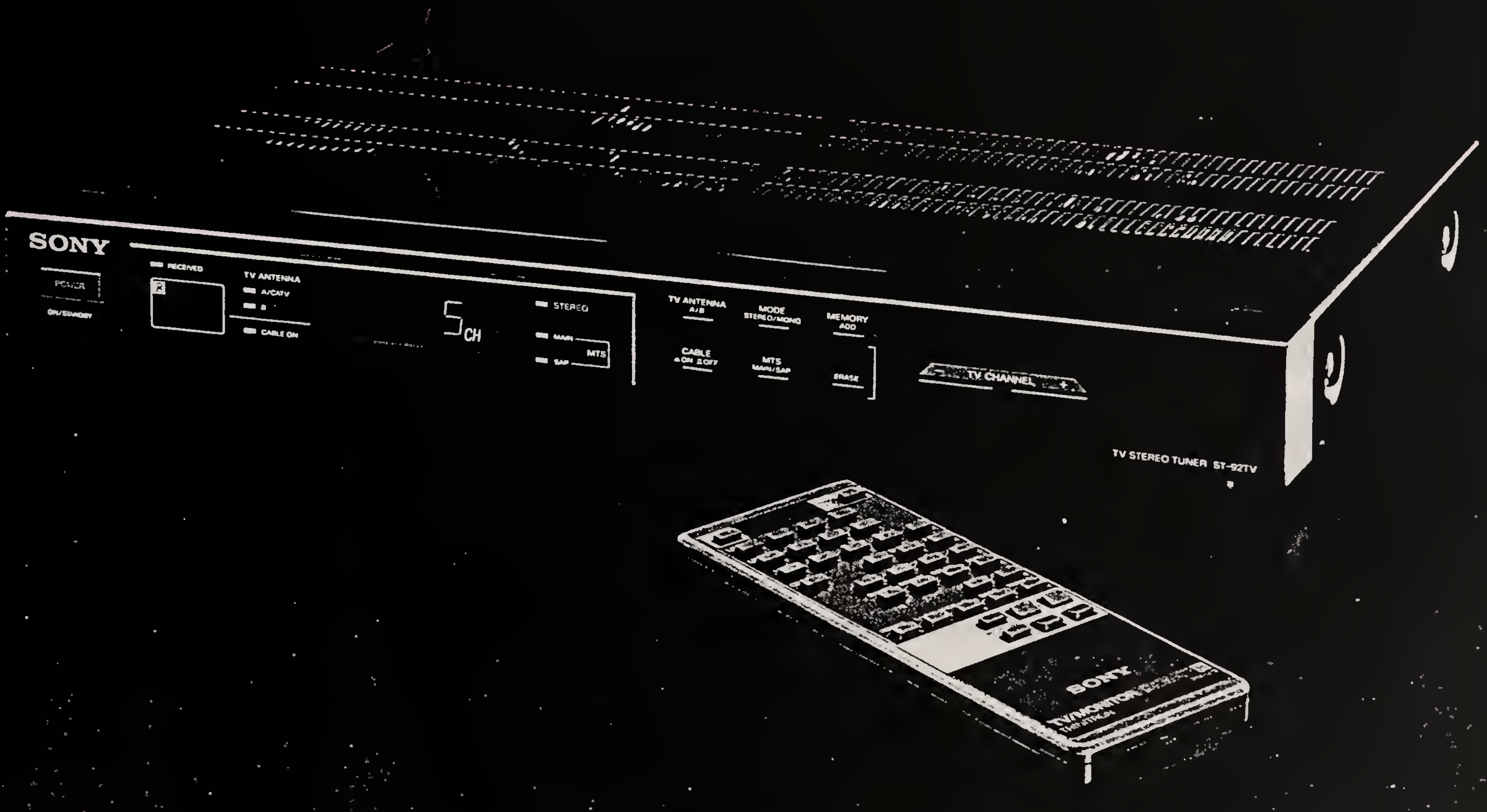
FRONT-PANEL CONTROLS, CONNECTORS, INDICATORS (see Figure 1)

1. **Microphone Channel Gain Controls 1 - 8:** Allows adjustment of microphone gain.
2. **Input LED 1 - 8:** Lights green when channel is active; lights red at 6 dB below clipping level.
3. **Low-Cut Filter 1 - 8:** Recessed screwdriver adjustment provides adjustable low-frequency rolloff (high pass) to reduce undesirable low-frequency signals.
4. **High-Frequency Shelving Filter 1 - 8:** Recessed screwdriver adjustment provides level boost or cut in mid/high-frequency region for compensation of off-axis lavalier microphones, or for cutting the high-frequency sibilance of vocal microphones.
5. **AUX Level Control:** Sets the input level for aux-level equipment connected to the adjacent $^1/_4$-inch phone jack **INPUT** or rear-panel $^1/_4$-inch **AUX** input.
6. **Aux INPUT $^1/_4$-inch Phone Jack:** Mixes external auxiliary- or line-level sources, i.e., tape recorders, into output. This out is *not* automatic. Signal appears at output of all linked mixers.
7. **MASTER Level Control:** Determines the overall mix level.
8. **Output Level Meter:** Nine-segment LED meter indicates peak output signal level. Last LED indicates limiter action.
9. **PHONES Control and $^1/_4$-inch Phone Jack:** Permits monitoring of mixer output through headphones. **PHONES** control determines headphones output level.
10. **POWER LED:** Lights green when unit is powered.

SONY

TV Stereo Tuner

ST-92TV



The ST-92TV is a TV tuner which receives a total of 181 VHF, UHF, and Cable TV channels. With the multi-channel TV sound decoder incorporated, the tuner can receive both stereo and secondary audio broadcast programs. Functions such as channel preset and 10-key direct access tuning allow easy operation using the supplied RM-U72 wireless remote control unit. In addition, the RM-U72 can control both the ST-92TV and a connected display device with the control S connector.

MAIN FEATURES

Wide Channel Coverage

Multi-band VHF/UHF/Cable TV tuner receives up to 181 off-air and cable channels.

Multi-Channel TV Sound (MTS)

Built-in MTS(Multi-channel TV Sound) decoder enables the reception of both stereo programs and SAP (Second Audio Program) broadcasts*

* Stereo and SAP reception is possible when these services are encoded.

Full Auto Channel Preset Function

By using the ADD and ERASE buttons on the ST-92TV, only the desired TV channels can be preset in the tuner.

10-key Direct Access Tuning

In addition to the auto channel tuning, channel selection can be performed by pressing the 10-key pad on the remote commander.

Remote Control Function

The supplied wireless remote commander RM-U72 can control both the TV tuner and display device connected with control S, including functions such as input source selection, picture and sound adjustments.

Specifications

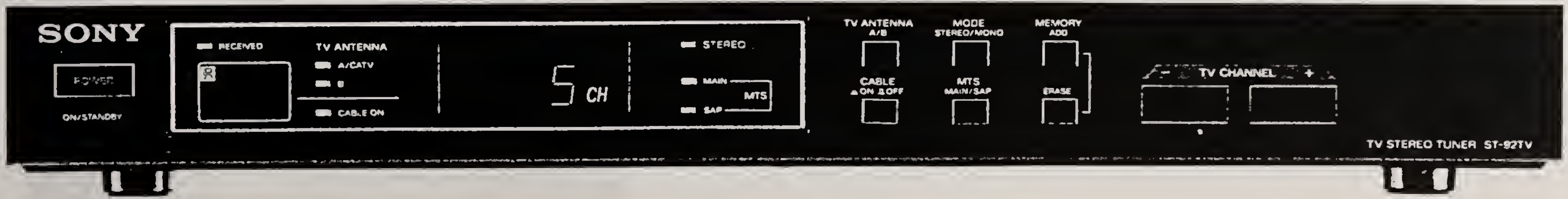
GENERAL	
Color system	NTSC
Television system	American TV standard
Channel coverage	VHF: 2-13 UHF: 14 - 69 Cable TV. 1 - 125
Antenna	75 Ω antenna terminals A/ CATV, TO CONVERTER, and B
Power requirements	AC 120V, 60Hz
Power consumption	20W, 10W (In standby condition)
Weight	Approx. 3.1kg (6 lb 13 oz)
Dimensions	Approx. 430 (W) x 55 (H) x 280 (D)mm (17 x 2 1/4 x 11 1/8 inches)
OUTPUT	
VIDEO OUT	Phono connector 1Vp-p, sync negative, 75Ω, unbalanced
R/ SAP, L/MAIN	Phono connector - 4dBs (489 mVrms), 5kΩ

SUPPLIED ACCESSORIES

Remote commander
RM-U72 (1)
Size AA Battery (2)
Antenna connector (1)
Audio connecting cord
(Phono x 2 to Phono x 2) (1)
Video connecting cord
(Phono to Phono) (1)
Control cable (Mini to Mini)

Remote commander
RM-U72

Front Panel



Rear Panel

* Design and specifications subject to change wihtout notice.

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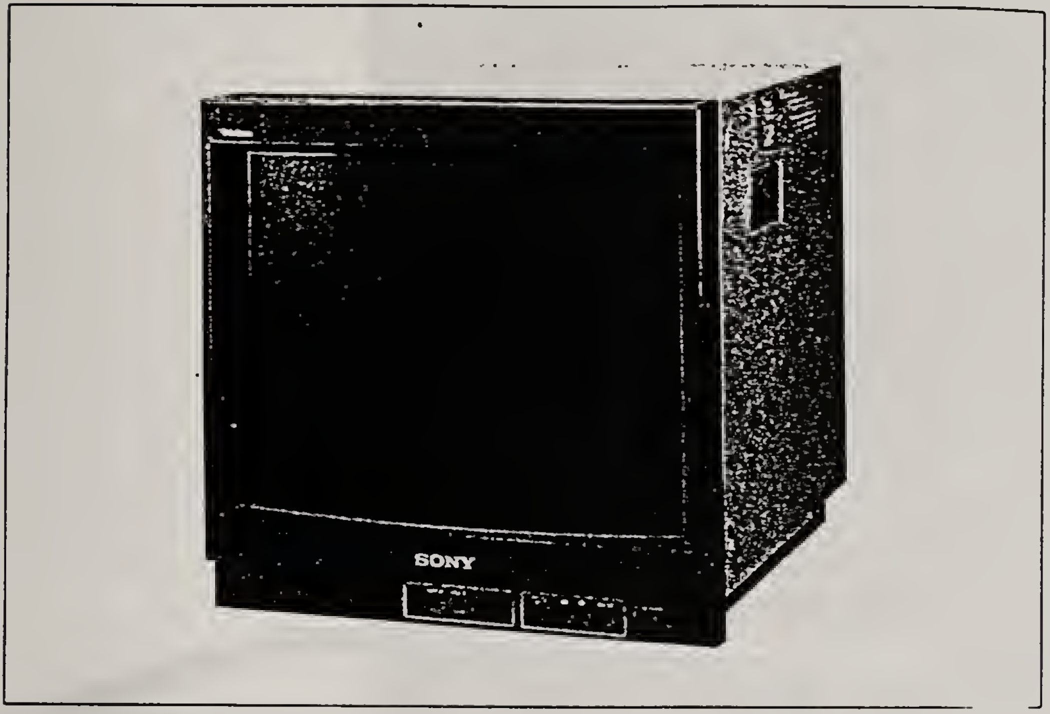
MONITOR

PVM-20N1U (NTSC/PAL/SECAM/NTSC$_{4.43}$)

PVM Series



- Resolution of 500TV lines
- Beam current feedback circuit for stability in the color balance
- Accepts composite video and Y/C signals
- On-screen menu for adjustment/operation
- Caption vision is available with the optional caption vision board BKM-104
- Built-in speaker
- Mountable into a 19-inch EIA standard rack with the optional SLR-103A

Mass:	28 kg (61 lb 11 oz)
Power consumption:	100 W
Dimensions:	449 (W) x 441 (H) x 502 (D) mm (17 $^{11}/_{16}$ x 17 $^{3}/_{8}$ x 19 $^{3}/_{4}$ inches)

SYSTEM 12 DMT II

Designed for midfield use in major studios or as a main monitor for smaller control rooms and mobile studios, the System 12 DMT II offers the more critical engineer accurate, reference sound quality for music or broadcast monitoring. State-of-the-art design and material technology have advanced the System 12 DMT II a long way from its predecessor, the industry standard 'Tannoy Little Red'. With the latest enclosure and crossover construction these new phase coherent 12 inch Dual Concentric systems offer exceptional transparency and pin point stereo accuracy making them fatigue free and consistently reliable for short or long sessions.

- 12 inch full-range, point source Dual Concentric DMT Driver
- High sensitivity, high power design
- HF waveguide for ideal spherical high frequency wavefront
- Compression moulded Nitrile HF surround
- User replaceable self-centring HF diaphragm assembly
- HF coil wound with rectangular section copper-clad aluminium wire
- Magnetic fluid cooled coil using latest high performance fluid
- Strip leadouts for improved reliability
- Felt damping plug behind HF dome to reduce cavity resonances
- Injection moulded LF cone
- Anti diffraction ring reduces HF diffraction due to LF roll surround
- LF coil wound with rectangular section copper wire
- Polypropylene DMT HF mega capacitor
- Film capacitors throughout
- Bi-Wired gold-plated terminals
- Braced cabinet/driver energy damping system
- Rugged cabinet styling comprising high pressure twin laminated MDF walls within a grey soft-texture space-frame
- Vented, die-cast drive unit chassis increases heat dissipation and power handling
- Resistive port design using twin laminar flow tubes
- Split crossover with inductor remotely mounted
- Custom manufactured woven internal wiring
- Five-year warranty

TANNOY

MONITOR SERIES

TANNOY

MONITOR SERIES

SYSTEM 12 DMT II

TECHNICAL SPECIFICATIONS

RECOMMENDED AMPLIFIER POWER
50 to 300 watts

PEAK POWER HANDLING
450 watts

NOMINAL IMPEDANCE
8 ohms

SENSITIVITY (2.83 volts @ 1 m)
96 dB

DISTORTION
Less than 0.5% 40 Hz - 25 kHz

PHASE RESPONSE
System behaves substantially as a frequency independent time delay

DISPERSION
90 degrees conical

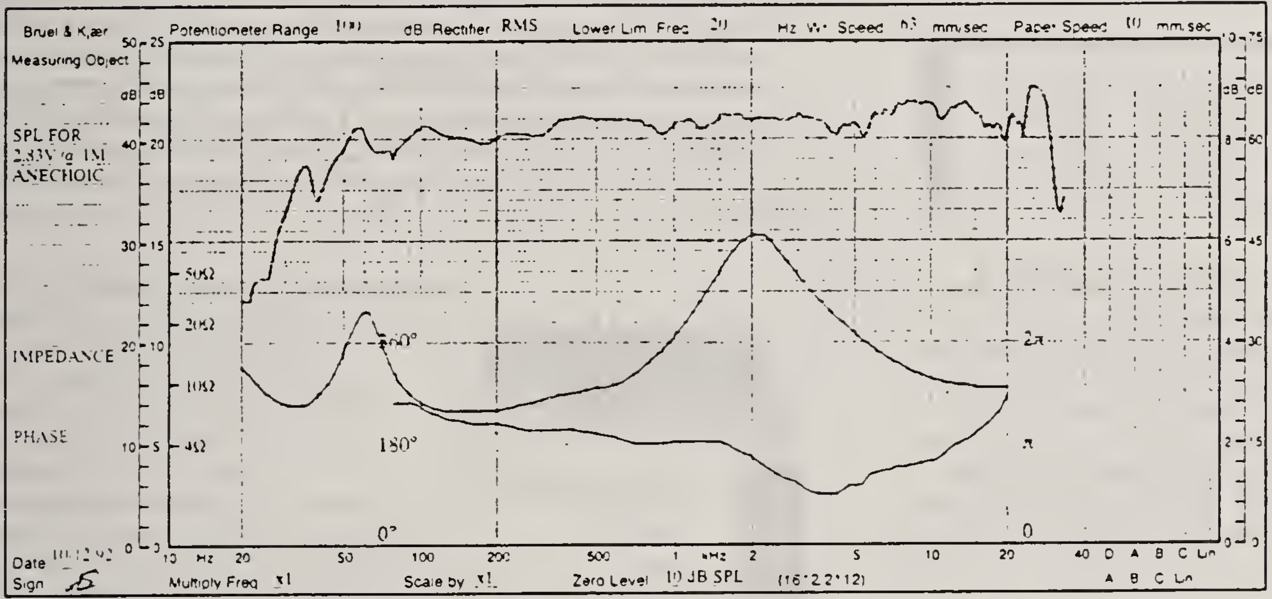
CROSSOVER FREQUENCY
1.4 kHz

CROSSOVER TYPE
Second-order, overdamped low frequency; first-order high frequency. Positive acoustic polarity

CROSSOVER CONTROLS
Treble energy range 2 kHz - 25 kHz
+1.5 dB, level, -1.5 dB

FREQUENCY RESPONSE (±3 dB)
40 Hz - 25 kHz

DRIVE UNIT TYPE
12 inch 3136GG Dual Concentric



CABINET SPECIFICATIONS

CABINET INTERNAL VOLUME
70 litres

CABINET MATERIAL
MDF (30mm - front and back; 20.6mm - top, bottom and sides) with energy absorbing bracing matrix and TF-2 acoustic wadding

CABINET FINISH
Velti shadow grey soft-texture finish. High pressure twin laminate in shadow grey with metallic speckled finish on top, bottom and sides

GRILLE
Single piece, black acoustically transparent material on a wooden frame

CABINET DIMENSIONS (H x W x D)
645 x 420 x 390mm
(25.4 x 16.5 x 15.4 inch)

CABINET WEIGHT
32 kg (70.5 lbs)

SHIPPING DIMENSIONS (H x W x D)
Approximately 745 x 495 x 485mm
(29.3 x 19.5 x 19.1 inch)

SHIPPING WEIGHT
Approximately 37 kg (81.6 lbs)

Power amp specifications are for guidance, responsible use with larger power amplifiers on wide dynamic range material is permissible

Frequency limits are -3dB reference the sensitivity figure, which is averaged over quoted bandwidth for half space (2π) environments. For anechoic conditions (4π environments) decrease by 3dB. Distortion figures show the geometric sum of the residual components. The power handling figures are derived using shaped noise signal based on DIN 45 500 specifications over a 300 hour accelerated life test. For equivalent continuous sine wave figures factor by 1 (√2) and, -3dB below 100 Hz and above crossover frequency

Our policy commits us to incorporating improvements to our products through continuous research and development. Please confirm current specifications for critical applications with your supplier.

ARCHITECTURAL SPECIFICATIONS

The MONITOR SYSTEM shall consist of a 12 inch full-range, single point source, Dual Concentric transducer and a second-order overdamped low frequency, first-order high frequency with positive acoustic polarity frequency dividing system.

Performance of the MONITOR shall meet or exceed the following criteria: frequency response 1 metre on axis with swept sine wave shall be 40 Hz - 25 kHz ±3 dB, sensitivity shall be at least 96 dB for 1 watt at 1 metre, nominal impedance shall be 8 ohms with a rated power capacity of at least 450 watts peak.

The enclosure shall be a DMT energy controlling structure with dimensions not exceeding 645 x 420 x 390mm.

THE MONITOR SHALL BE THE TANNOY...SYSTEM 12 DMT II.

TANNOY

HEAR
BELIEVE

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TANNOY LTD., ROSEHALL INDUSTRIAL ESTATE,
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TEL: (0236) 420199. TLX: 778621 TANMFG G.
FAX: (0236) 428230.

TGI / TANNOY, 300 GAGE AVENUE, KITCHENER,
ONTARIO, CANADA N2M 2C8. TEL:(519) 745 1158
FAX: (519) 745 2364

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2611 RV DELFT, THE NETHERLANDS.
TEL: (015) 124034. FAX: (015) 125213

Part number 6483 0216 Issue 2

SG-2PG4 Genlockable Color Pattern, Blackburst and Sync Generator

The SG-2PG provides all of the features of the SG-2, plus a selection of test patterns. The pattern output provides 1 of 5 test patterns or blackburst, selected by front panel controls. 2 additional customized test patterns may be specified when the unit is ordered. Includes S-Video (Y/C) and composite test pattern outputs. Custom test patterns can use any configuration of the available colors in an 84H x 64V pixel array. 1 or 2 customized alphanumeric IDs can also be ordered for each test pattern and turned on/off as desired. When activated, these IDs overlay the selected test pattern. Chrominance values are internally adjustable to allow precise matching of the SG-2PG4's color vectors to the characteristics of the vectorscope being used. The pattern output timing and phase parameters match those of the 8 blackburst outputs whether the unit is genlocked or free-running.

SG-2PG4 .... $1495.00

SG-2 Genlockable RS-170A Blackburst and Sync Generator

The SG-2 genlockable blackburst and sync generator provides 8 blackburst, 1 subcarrier and 6 pulse outputs. An array of front panel indicators provides information about the sync tip level, SC/H phase and frequency of the signal at the genlock input to help diagnose any genlock problems that may arise. The SG-2 automatically falls back to its internal temperature compensated crystal time base without interruption of the output signals if the genlock input signal fails. The 8 identical blackburst outputs are guaranteed to meet RS-170A specifications including SC/H phase, frequency accuracy, rise times and amplitudes from the moment the unit is plugged in. Multiple outputs eliminate the need for a blackburst distribution amplifier. The subcarrier and pulse outputs allow equipment requiring them to genlock to a composite video or blackburst signal by using the SG-2 as a means of conversion. Such equipment can now also be synchronized with other equipment requiring blackburst. Each pulse output connector can be internally reprogrammed to carry a particular pulse.

SG-2.. $987.00

BBG-2 Blackburst Generator

The BBG-2 provides 9 identical blackburst outputs for system synchronization. This unit includes a temperature compensated crystal time base to help guarantee compliance with RS-170A specifications including SC/H phase, frequency accuracy, rise times and amplitudes from the moment the unit is plugged in. Multiple outputs eliminate the need for a blackburst distribution amplifier. Burst, sync, blanking and setup levels are internally adjustable. Specify 120VAC or 12VDC power supply when ordering.

BBG-2 .... $495.00

Absent Signal Alarms

Prevent unnoticed loss of signal. The VA-2 and AA-2 alarms provide both audible and visible alarms whenever the input signal is lost. The alarm continues to sound until the loss of signal condition is corrected.

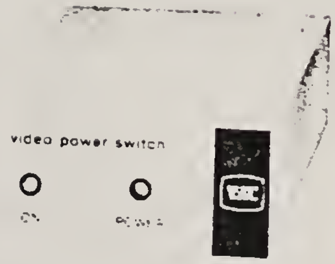
AA-2	Audio signal loss alarm	$220.00
VA-2	Video signal loss alarm	220.00

VB/BBG Brick Blackburst Generator

Provides 4 blackburst outputs guaranteed to meet RS-170A specifications including SC/H phase, frequency accuracy, rise times and amplitudes from the moment the unit is first powered. Trimmable burst level. 12-24V, 100mA, ungrounded, AC adaptor included.

VB/BBG $249.00

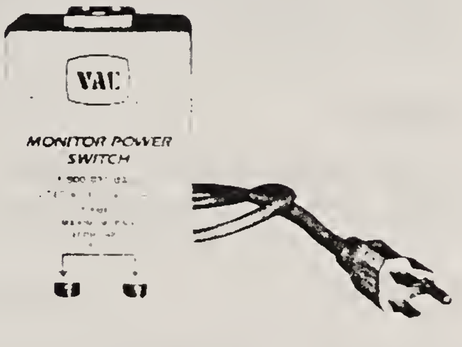
Signal Activated Power Switches



Prolong equipment life and save energy by automatically switching off equipment when signals are no longer present, and automatically turning it back on when the signal is reapplied.

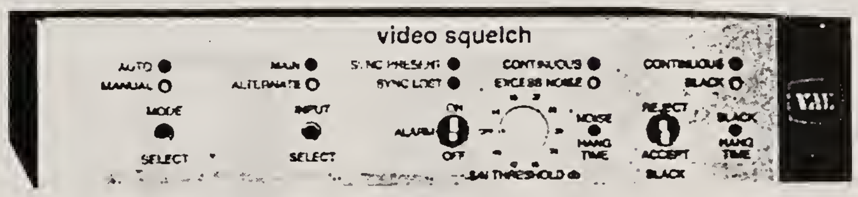
APS-2	Audio activated power switch	$220.00
VPS-2	Video activated power switch	220.00

VMPS-2 Video Monitor Power Switch



The VMPS-2 automatically switches power off whenever the video sync-tip amplitude at the input drops below 21 IRE and returns power when the input sync-tip returns to above 28 IRE. The loopthrough input allows this unit to be easily inserted in the line between the signal source and destination. The VMPS-2 applies power only when a signal is present. It installs easily between video source and destination.

VMPS-2 .... $220.00



VS-3 Video Squelch

When unsatisfactory degradation or loss of main video occurs, this unit automatically switches to alternate video source feeds, and provides an alarm to alert you to the condition. Detects excess noise and loss of H-sync from main video source. It can accept or reject black from main video source. A manual mode, where either main or alternate inputs can be selected for output, can be invoked by front panel control or the rear panel remote control port. The loopthrough inputs allow each signal to be routed to additional equipment.

VS-3 .... $995.00

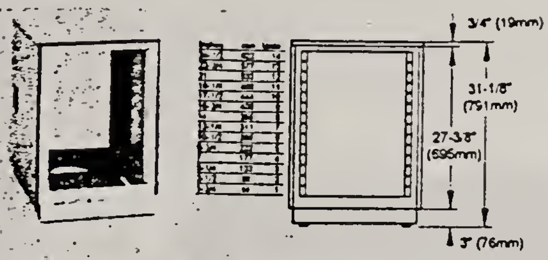
VL-2 Video Line Isolator

Remove ground loop generated hum bars from your system with the VL-2. Optical coupling provides 80dB of ground noise reduction, and the unit can withstand up to 1500V between input ground, output ground and AC ground. A front panel lamp warns of potential shock hazards due to voltages between the 3 "grounds." Internal gain and frequency adjustments provide compensation for long cable runs. The unit is also available with an audio isolator so both audio and video can be distributed through the same isolated path.

VL-2	Video line isolator	$340.00
VL-2A	Video line isolator with audio option	395.00

ADDITIONAL PRODUCTS AVAILABLE. PLEASE CALL.

COMPLETE VERTICAL RACKS continued...



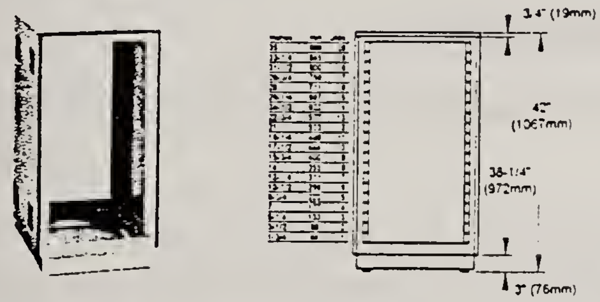
24-1/2" (14U) VERTICAL RACKS

A **24-1/2" (622mm) Standard Vertical Rack Cabinet.** 26" Deep (660mm) rack cabinet. Dove Grey and Pearl Grey baked-on enamel finish with vents in the sides for cooling. Overall size: 31-1/8"H (790mm) x 22-9/16"W (573mm) x 28"D (711mm).

Model V8603. Shpg. wt. 88 lbs. **$575.00**

24-1/2" (622mm) Space Saving Vertical Rack. 19-3/8"D (492mm) rack cabinet. Same features as Model V8603. Overall size: 31-1/8"H (790mm) x 22-9/16"W (573mm) x 21-3/8"D (542mm).

Model V8403. Shpg. wt. 86 lbs **$570.00**



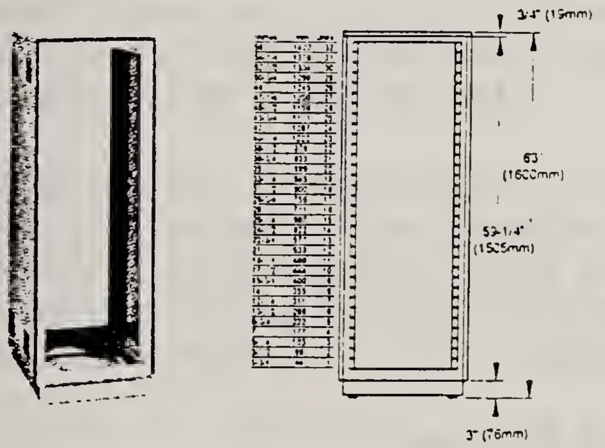
35" (20U) VERTICAL RACKS

B **35" (889mm) Standard Vertical Rack Cabinet.** 26" Deep (660mm) rack cabinet. Dove Grey and Pearl Grey baked-on enamel finish with vents in the sides for cooling. Overall size: 42"H x 22-9/16"W (573mm) x 28"D (711mm).

Model V8606. Shpg. wt. 106 lbs. **$730.00**

35" (889mm) Space Saving Vertical Rack. 19-3/8" (492mm) Deep rack cabinet. Same features as Model V8606. Overall size: 42"H (1067mm) x 22-9/16"W (573mm) x 21-3/8"D (542mm).

Model V8408. Shpg. wt. 102 lbs. **$725.00**



56" (32U) VERTICAL RACKS

C **56" (1422mm) Standard Vertical Rack Cabinet.** 26" Deep (660mm) rack cabinet. Dove Grey and Pearl Grey baked-on enamel finish with vents in the sides for cooling. Overall size: 63"H (1600mm) x 22-9/16"W (573mm) x 28"D (711mm).

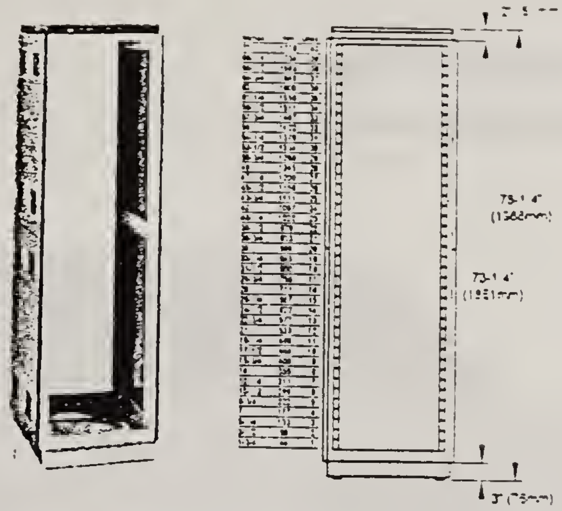
Model V8632. Shpg. wt. 143 lbs. **$845.00**

56" (1422mm) Space Saving Vertical Rack. 19-3/8" Deep (492mm) rack cabinet. Same features as Model V8632. Overall size: 63"H (1600mm) x 22-9/16"W (573mm) x 21-3/8"D (542mm).

Model V8432. Shpg. wt. 136 lbs. **$840.00**

56" (1422mm) Extra Deep Vertical Rack. 30"D (762mm) rack cabinet. Same features as Model V8632. Overall size: 63"H (1600mm) x 22-9/16"W (573mm) x 32"D (812mm).

Model V8732. Shpg. wt. 158 lbs. **$889.00**



70" (40U) VERTICAL RACKS

D **70" (1778mm) Standard Vertical Rack Cabinet.** 26" Deep (660mm) rack cabinet. Dove Grey and Pearl Grey baked-on enamel finish with a vented top and open base for cooling. Overall size: 78-1/4"H (1988mm) x 22-9/16"W (573mm) x 28"D (711mm).

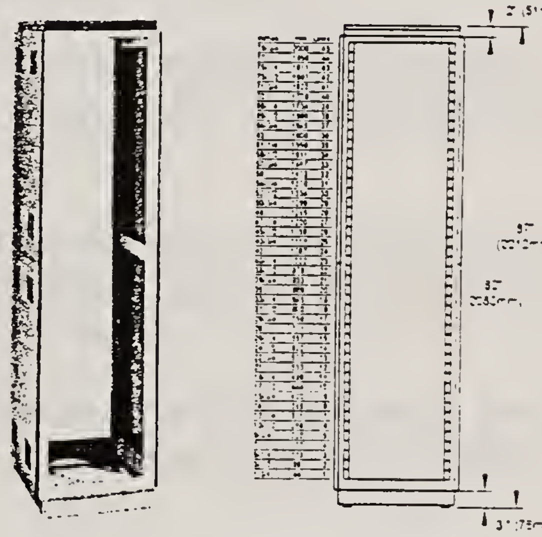
Model V8601. Shpg. wt. 174 lbs. **$988.00**

70" (1778mm) Space Saving Vertical Rack. 19-3/8" Deep (492mm) rack cabinet. Same features as Model V8601. Overall size: 78-1/4"H (1988mm) x 22-9/16"W (573mm) x 21-3/8"D (542mm).

Model V8477. Shpg. wt. 168 lbs. **$987.00**

70" (1778mm) Extra Deep Vertical Rack. 30"D (762mm) rack cabinet. Same features as Model V8601. Overall size: 78-1/2"H (1988mm) x 22-9/16"W (573mm) x 32"D (812mm).

Model V8777. Shpg. wt. 195 lbs. **$1045.00**



78-3/4" (45U) VERTICAL RACKS

E **78-3/4" (2000mm) Standard Vertical Rack Cabinet.** 26" Deep (660mm) rack cabinet. Dove Grey and Pearl Grey baked-on enamel finish with a vented top and open base for cooling. Overall size: 87"H (2210mm) x 22-9/16"W (573mm) x 28"D (711mm).

Model V8691. Shpg. wt. 189 lbs. **$1141.00**

78-3/4" (2000mm) Space Saving Vertical Rack. 19-3/8" Deep (492mm) rack cabinet. Same features as Model V8691. Overall size: 87"H (2210mm) x 22-9/16"W (573mm) x 21-3/8"D (542mm).

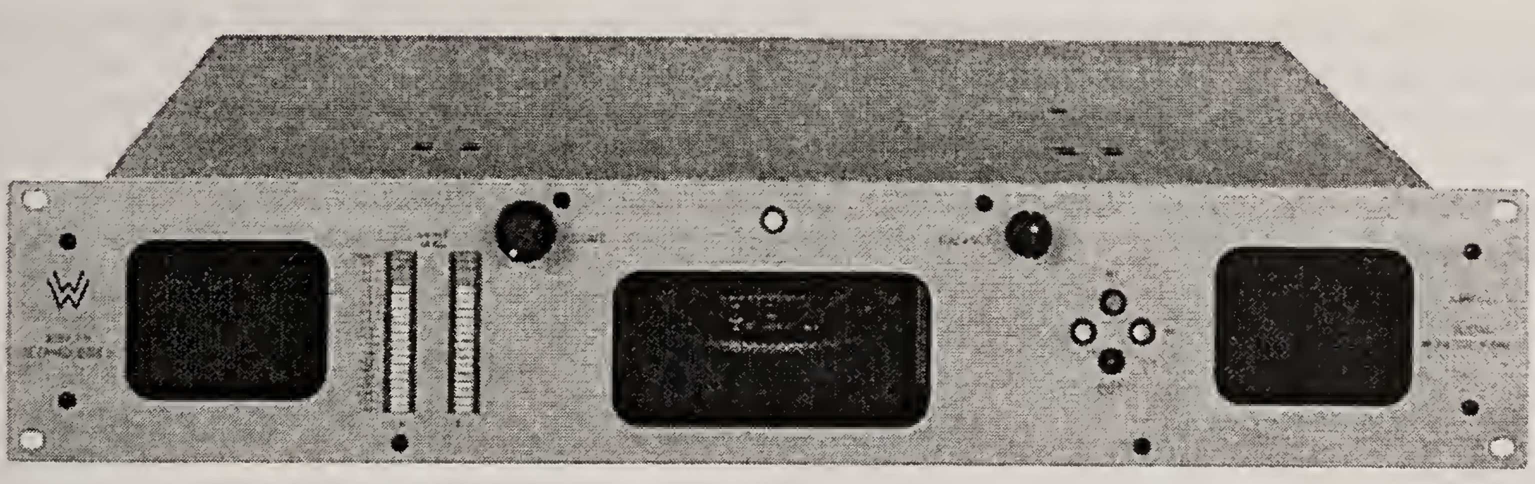
Model V8479. Shpg. wt. 179 lbs. **$1140.00**

78-3/4" (2000mm) Extra Deep Vertical Rack. 30"D (762mm) rack cabinet. Same features as Model V8691. Overall size: 87"H (2210mm) x 22-9/16"W (573mm) x 32"D (812mm).

Model V8779. Shpg. wt. 207 lbs. **$1190.00**

Back to SELF-POWERED SPEAKERS

Back to WOHLER HOME PAGE



AMP-2 Series Self-Powered Speaker Systems

FEATURES | OPTIONS | SPECIFICATIONS

The AMP-2 is a complete, exceptionally high quality stereo audio monitoring system in a compact, two rackspace

cabinet. It contains three audiophile-quality drivers and three power amplifiers; two speakers and amplifiers reproduce midrange and high frequency information in stereo, while the third amp/driver combination handles summed LF information below the 500 Hz crossover point.

The AMP-2's unique design has two important advantages. First, it provides optimally focused sound in an Ultra Near Field tm (1 to 3 feet) environment. This allows higher SPL for the operator while reducing overall ambient sound and adjacent bay crosstalk.

Second, electronic rather than acoustic cancellation of bass frequencies provides positive audible detection of reversed polarity ("out of phase") audio feeds. A unique "phase" LED display also visually shows all signals present and their "phase" (polarity) relationships.

The AMP-2 provides innovative solutions to a variety of monitoring problems. Overall performance surpasses that of many popular monitor pairs, yet the AMP-2 eliminates installation hassles, awkward placements, and an "added-on" look.

Thorough magnetic shielding allows an AMP-2 to be placed directly above or below color video monitors with no visible color impurities- even on a blank red screen. Designed and manufactured in the U.S., the AMP-2 is backed by a strong warranty and a satisfaction guaranteed returns policy. The AMP-2 is ideally suited for use in VTR bays, mobile production vehicles, teleconferencing, multimedia systems, satellite link and cable TV facilities, and on-air radio studios.

(See AMP-1 page to find out about our High-Fidelity Audio Monitor in 1U).

FEATURES: Premium quality drivers for superior reproduction. 104dB SPL at 2 feet; Extended frequency response and low distortion Audible indication of phase/polarity problems Dual 20-segment LED meters Innovative LED display of phase/polarity relationships Numerous control and input options Thorough magnetic shielding for placement next to video monitors Quick and easy installation: simply slide in the rack and connect audio and AC power

UL approved power supply, international versions available for 100/230 V 50/60 Hz power source. 0 dbV ref. 0.775V RMS. Features and specifications subject to improvement without notice.

Analog Meter Version The AMP-2AM is identical to the AMP-2, except for the two mechanical analog level meters which replace the LED ladders. Industry standard VU or PPM movements are available.

OPTIONS: Wohler Technologies will adapt the AMP-2 to meet your particular requirements at a reasonable cost. Available options include: Multiple input options from 2 to 10 stereo with selector switches. Additional separate option provides balanced XLR line output with level adjust of selected input. AES/EBU and Serial Digital inputs Mono, mute, and mode switches Transformer coupled inputs Headphone output Separate channel volume controls FULL output power DC operation Peak hold on meters Other custom options are possible. Call your dealer or Wohler Technologies to discuss your specific needs.

SPECIFICATIONS:

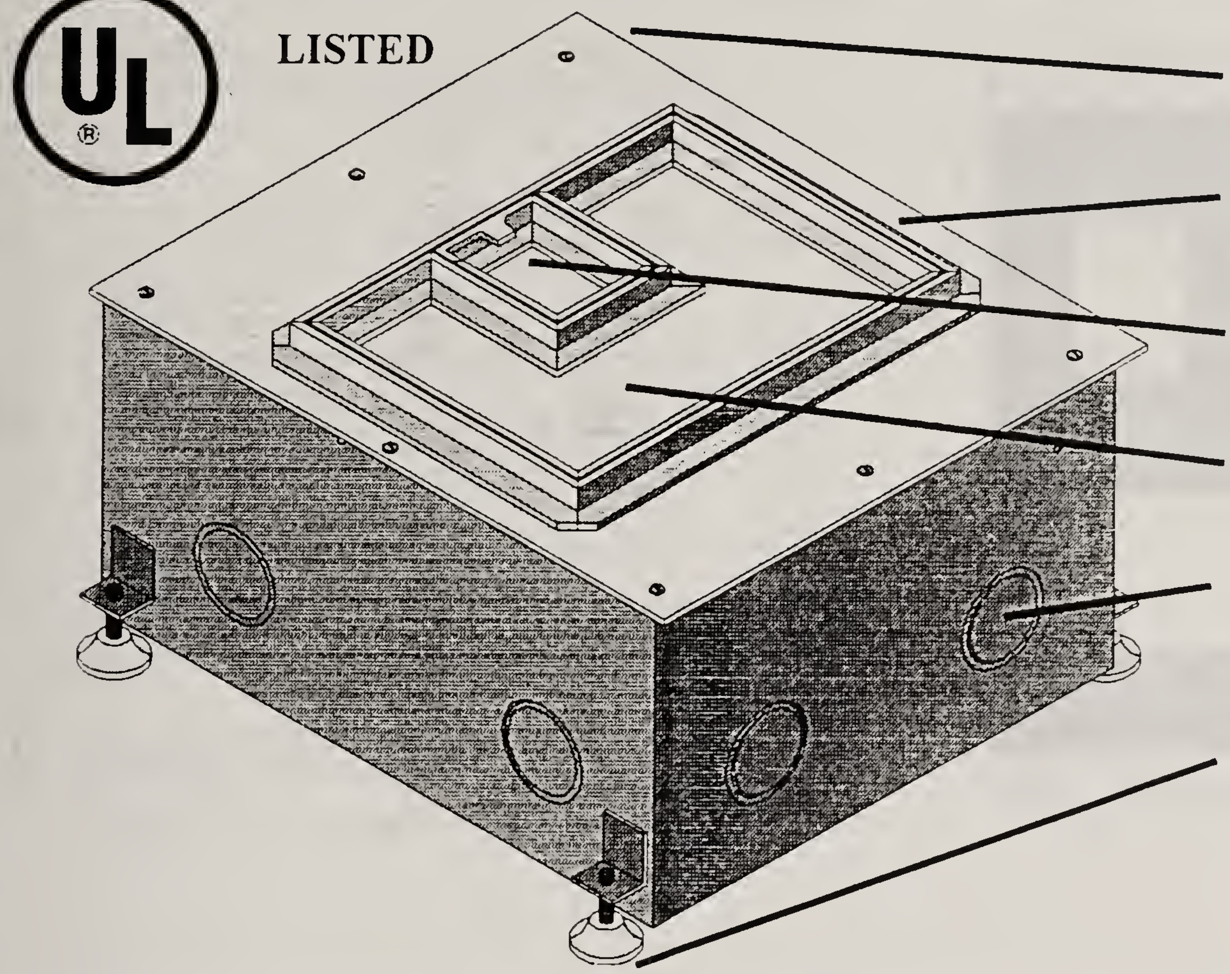
Input impedance	100 kohms balanced; 22 k ohms unbalanced
Minimum Input level for maximum output (max volume)	0 dBv bal./ -12dB unbalanced
Input overload	+26 dBv balanced +14 dBv unbalanced
Peak acoustic output (@ 2 ft.)	104 dB SPL
Response, sixth octave (@ 2 ft.)	80 Hz - 16 kHz (+/-5dB) (-10 dB @ 40Hz, 20kHz)
Power output RMS each side (4 OHMS)	20W transient/11W continuous
RMS center bass (4 OHMS)	20W transient/11W continuous
Distortion, electrical	Less than 0.1% at any level below limit threshold
Distortion, acoustical	6% or less at worst case frequencies above 140 Hz
	including cabinet resonance; typically less than 1.5%
Hum and noise	Better than -68 dB below full output
Magnetic shielding	Less than 0.8 Gauss any adjacent surface
Input connectors	Balanced: loop-through XLR; Unbalanced; RCA phono
Power Consumption (avg. max.)	50W
Dimensions (avg. max.)	(H x W x D) 3.5 x 19 x 10 inches 89 x 483 x 254 mm
Weight	18 lbs. (8.2 kg) including power transformer
UL approved power supply	versions available: 110/100/230 V 50/60 Hz

Back to SELF-POWERED SPEAKERS

Back to WOHLER HOME PAGE

FSR inc.
METAL PRODUCT GROUP
244 Bergen Boulevard, West Paterson, NJ 07424 Tel 973-785-4347 Fax 973-785-3318 E-Mail fsr!sales@attmail.com

FL-500P
FLOOR BOX



DESCRIPTION

The FL-500P floor box is designed for conference rooms, auditoriums, banquet halls, etc. with carpeted floors over concrete. This floor box provides a practical solution for cable storage while maintaining easy access. The lift off section of the cover allows full access to internal cables and connector plates while a smaller hinged trap-door opens in to create a cable exit. All cables can be stored within the box when they are not in use,allowing unencumbered travel in the area.

The sturdy 11 gauge cover lies flush with the floor while the edging (brass or aluminum depending on room decor) is the only visible part seen through the carpet. The edging is available in 1/4" or 1/2" heights depending on carpet thickness.

Inside the FL-500P, two angled brackets are provided for cable connections with ample clearance for cable connectors. The connector plates provide a single, double and a four gang opening which are all isolated for maximum safety.

The FL-500P is extremely sturdy (steel and welded construction) and has been designed to fit the needs of power, audio, video and data applications.

SPECIFICATIONS

Size:
Box: 10" X 12" X Depth
Cover: 10.5"X12.5"X1/8"

Edging:
Height: 1/4" or 1/2"
Material: Brass or Aluminium

Weight: 16 pounds

Knockouts:
Total of eight, either 1" or 1-1/4"

Ordering Information:

FL-5OOP-X- Y

X = Cover Details
- B Brass 1/2" Carpet Flange
- S Aluminium 1/2" Carpet Flange
- BLP Brass 1/4" carpet flange
- SLP Aluminium 1/4" carpet flange

Y = Floor Box Depth
- 4 or 6 inches

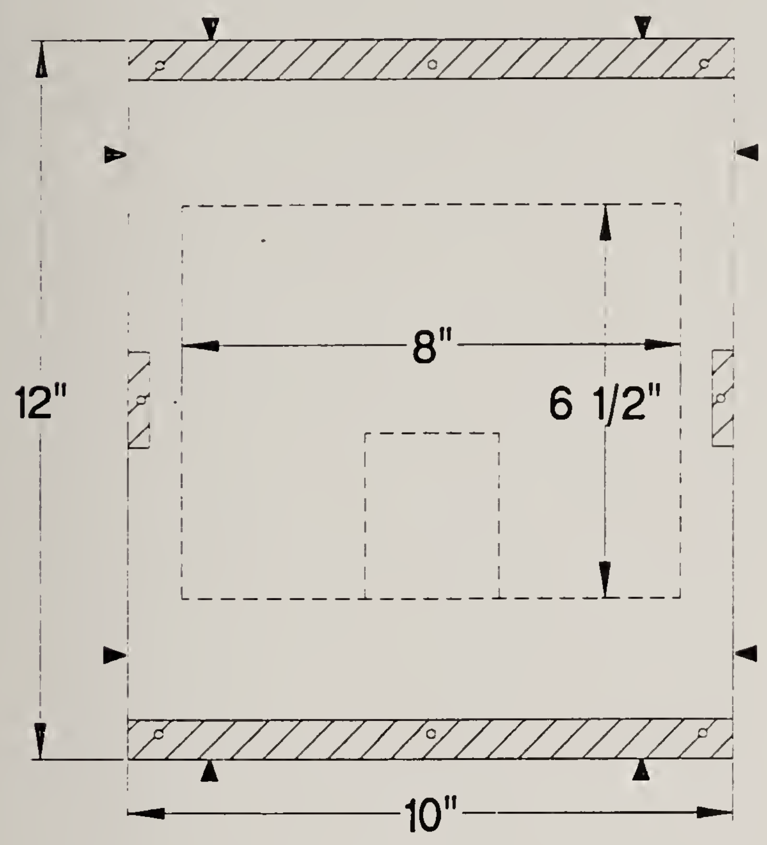
EXAMPLE: FL-500P-S is an FL-500P floor box with an aluminium 1/2" carpet flange.

Note; This floor box is only intended for carprted floors, where the accumulation of scrub water is unlikely to occur. Additionally this box is not applicable for contact with grade.

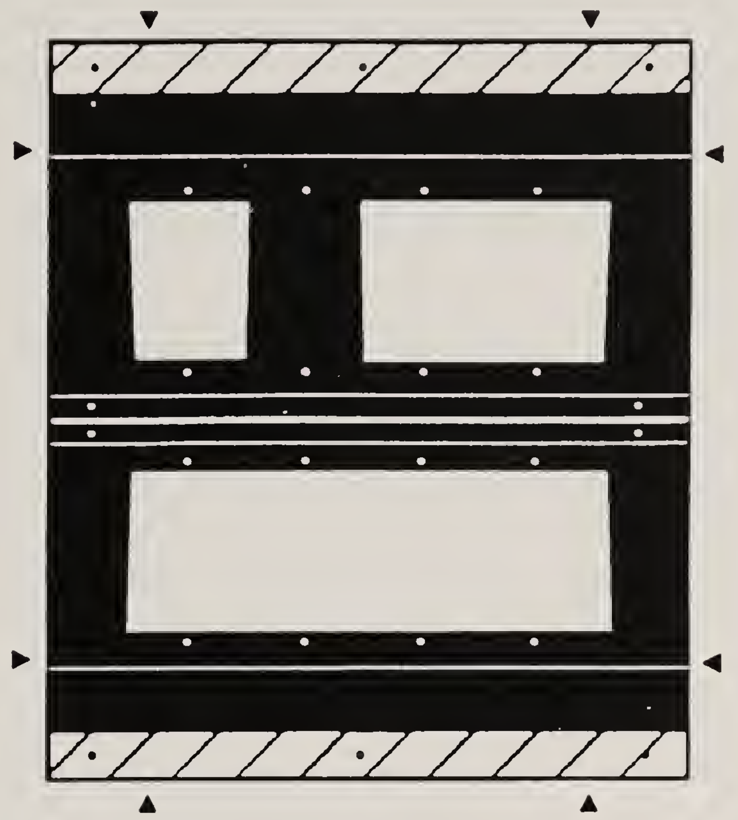
MP106B

FL-500P INTERNAL BRACKET ARRANGEMENTS

TOP VIEW WITH DOOR LOCATION

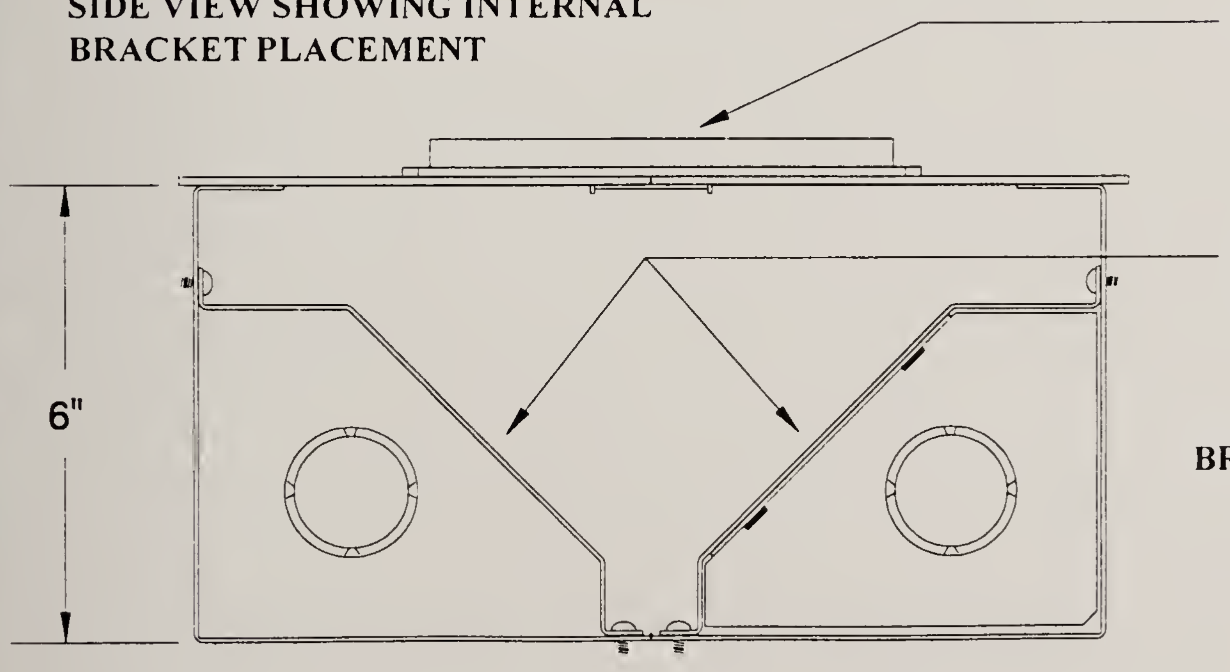


TOP VIEW WITH BRACKET ARRANGEMENT



NOTE: (◄) INDICATES KNOCKOUT LOCATION

SIDE VIEW SHOWING INTERNAL BRACKET PLACEMENT



Depth can be either 4 or 6 "

BRACKET ACCOMMODATIONS

4" box	6" box
48	72
60	94
112	168

above numbers
are cubic inches

OPEN ISSUES

ITEM	ISSUE	ACTION	RESPONSIBILITY	RESOLUTION
2.10.98 – 1	Identify a potential room to support full motion video conferencing from both the House and the Senate.			Resolved: There will be no dedicated video conferencing facilities installed as part of the renovation.
2.10.98-2	What are the infrastructure implications for a full motion video conferencing room?	Describe the infrastructure requirements and estimated costs for a full motion video conferencing room.	KC/fp	
2.10.98-3	What is available locally and throughout the state to provide video feeds to and from the Capitol?	Meet with TCI to determine what further infrastructure requirements they have. Verify point of presence in the Capitol and specifically what media they are using.	GSP and KC/fp	
2.10.98-4	Recommend locations for television access points.	Present recommendations at 3/5 working committee meeting.	KC/fp	
2.10.98-5	Could the Capitol possibly have it's own video distribution system to redistribute hearings or broadcast events?	Define what type of video headend would serve the needs of the Capitol and estimate the cost of the equipment.	KC/fp	
2.10.98-6	What is needed at a video headend if we decide one is needed?	Identify the following items required for the video headend room in the chiller plant building: space, electrical, mechanical and connectivity requirements.	KC/fp	
2.10.98-7	What is the extent of the current audio system in the house and senate.	Identify existing speaker locations on plans.	GSD	

ITEM	ISSUE	ACTION	RESPONSIBILITY	RESOLUTION
2.10.98-8	Hearing rooms and hallways are crowded with participants and citizens. More hearing rooms with broadcast capabilities could reduce congestion.	Identify which rooms will have recording capabilities. Develop a recommendation for an expansion of the audio distribution system for all hearing rooms.	KC/fp, GSD and Stakeholders	
2.10.98-9	A campus radio distribution system could provide an easy, cost effective way to broadcast special room events.	Investigate using a FM distribution system for audio distribution.	KC/fp	
2.10.98-10	Kiosks have been suggested to supplement existing capitol services. Where can they go and what do they need?	Recommend locations for kiosks. Supply a LAN and video connection and power for each kiosk location recommended.	A&E and Stakeholders	
2.10.98-11	All hearing rooms are to be treated equal. What do we provide at a minimum to provided audio/visual capabilities?	Develop minimum criteria for screens and lighting for in-room projection of network accessed information.	A&E and KC/fp	
2.10.98-12	Ideally each hearing room would have state of the art audio/visual presentation capabilities, what systems would be in place and what can we do now to prepare them?	Develop sample description of full audiovisual capability within one hearing room with a recommendation as to how to proceed.	A&E and KC/fp	
2.10.98-13	There are currently approximately a dozen locations that provide media access outlets in the Capitol. What locations will need to be added as the Capitol is renovated?	Meet with the existing TV stations and possibly Sunbelt – KTVH for input into the locations of additional conduits for enhanced media access. Identify additional locations for media access points.	A&E and GSD	

ITEM	ISSUE	ACTION	RESPONSIBILITY	RESOLUTION
2.10.98-14	Because the cable for the media access points was installed by one of the TV stations, will they install and pay for the additional drops requested?		**GSD**	
2.10.98-15	Hearing room and assembly rooms are not currently acoustically sound to broadcast.	Review potential accoustical treatments for use in hearing and assembly rooms.	A&E Architects	
2.10.98-16	The State of Indiana successfully implemented a wireless LAN in the state Capitol. Could this be a cost-effective solution for Montana?	Contact the State of Indiana to investigate the wireless solution they are using. Investigate potential wireless products that could be used within the Capitol. Define areas where wireless may be the best solution.	ISD – Carl Hotvedt KC/fp KC/fp	
2.10.98-16	The states' PBX vendor, Nortel has a wireless product. Would this be an appropriate solution for the capitol?	Investigate the wireless product developed by the State's telephone system provider – the Nortel Companion. Nortel contact: Jerry Jesup 406/444-0171	ISD KC/fp	
2.10.98-17	Hearing room residents change frequently. Could wireless technology handle these fluctuations?	Incorporate the use of wireless technology within hearing rooms to supplement wired locations.	KC/fp	
2.10.98-18	The current location of the House sound and voting system is becoming a stairwell.	Identify new location for voting and sound system controls.	A&E and KC/fp	
2.10.98-19	Both the House and Senate do not have LAN access currently, but demand is beginning to surface for the capability.	Recommend a LAN solution for both the House and the Senate Chambers.	KC/fp	

ITEM	ISSUE	ACTION	RESPONSIBILITY	RESOLUTION
2.10.98-20	Architectural diagrams of the Senate and House Chambers for KC/fp are needed for design illustration	Available at the end of DD.	A&E Architects	
12.8.97	Copiers will need network connections.	Identify potential locations.	A&E and GSD	
12.8.97-2	The public and the press requested power outlets in the balcony of the House and Senate chambers.	Provide electrical outlets in the balcony of the House and Senate Chambers for the public and the press to plug their lap tops in. Hard wire connections for voice or data is not required.	Summit	
12.8.97-3	Legislators have requested access to the internet while they are working in the Capitol.	Determine whether this should be direct or LAN based to develop appropriate infrastructure.	KC/fp and ISD	
12.8.97-4	Call in voting rights were requested in the House and Senate chambers.	Define infrastructure support appropriate to meet this need.	ISD and KC/fp	
12.8.97-5	In order to provide flexibility within the infrastructure, could we leave cable coiled up in the ceiling that is unterminated during installation?	Recommend a way to provide flexibility with minimal cost and building disruption for future installation.	KC/fp	
12.8.97-6	Chamber Automation			Resolved. There is no need for chamber automation.
12.8.97-7	The Legislative audit committee has expressed a desire to meet on-line.	Provide a means for the Legislative audit committee to meet on-line.	ISD	

ITEM	ISSUE	ACTION	RESPONSIBILITY	RESOLUTION
12.8.97-8	Hearings should be available via cable TV and be interactive – most especially to the schools.	Define infrastructure impacts or recommend solutions.	KC/fp	
		Provide infrastructure necessary in hearing rooms	KC/fp	
		Provide video distribution to "outside world."	ISD	Resolved
12.8.97-9	In order to deal with the space allocation issues during sessions, the concept of "hoteling" was introduced.			Hoteling is not an acceptable means of space and office allocation.
12.8.97-10	Representative Bob Keenan suggested KC/fp contact Roeby Simons to discuss new ideas regarding cable TV distribution. (406/222-5763 or cvisions@alpinet.net)		KC/fp	
5.2.96-1	The standard configuration for a workgroup is as follows: 1 phone/building occupant 1 computer/building occupant 1 laser printer/?? 1 fax/??? 1 copier/???	Determine base building ratios for Capitol	Stakeholders	

ITEM	ISSUE	ACTION	RESPONSIBILITY	RESOLUTION
5.2.96-2	Centralized data equipment to be stored in 1 large room to handle, at a minimum: ▪ 20 mid tier network servers ▪ MDF for fiber backbone ▪ Active network equipment ▪ 1 RPE box to provide local support for NT SL/1 ▪ MDF for copper backbone ▪ No video headend	Provide criteria for electrical, mechanical and space requirements. ISD to supply UPS	KC/fp ISD	
5.2.96-3	This data room will be maintained and operated by ISD.	Work with other agencies to see if they will agree to this concept and give up space for individual rooms.	A&E Architects ISD	
5.2.96-4	Multipurpose room will be identified that will accommodate multiple levels of technology. Plan for the maximum level of technology.	Identify which roam and maximum level of technology	A&E Architects Stakeholders	
5.2.96-5	Phone service, separate from the State, needs to be provided for pay phones and the Press.	No action on pay phones – they will remain as is Consolidate and label service for press.	ISD/KC/fp	

CAPITOL RESTORATION PROJECT
MEETING MINUTES
AMENDED MARCH 10, 1998

MEETING: Video, Audio and Wireless Services
MEETING DATE: February 10, 1998
LOCATION: Capitol Building, Room 410

ATTENDEES:

Paul Blumenthal	GSD
Bill Bayless	GSD
Carl Hotvedt	ISD
Nan LeFebvre	LFD
Stephen Maly	LSD
Bob Person	LSD
Dennis Deppmeier	A&E Architects
Linda Kirkland	ISD
Jim White	ISD
Michael Ageno	KC/future planning, inc.
Jane L. Hammon	OBPP
Chuckie Cramer	Senate
Doug Olson	GSD
Ed Baum	ISD
Kathleen Clancy	KC/future planning, inc.

DISTRIBUTION:

Attendees	
Tom O'Connell	A&E
Jim Bos	A&E Arch.
Greg Cunniff	Summit
Bill Lomica	Summit

NEXT MEETING: Date: **March 11, 1998**

The attached description of Video, Audio and Wireless Services was discussed during our meeting. We have noted changes and additions to these notes from the discussion in italics. **3/10/98 amended items are noted in bold type.**

Video, Audio and Wireless Services

The following items represent an outline of the video, audio and wireless services desired within the Capitol. It is our goal to provide an infrastructure to support all services that are anticipated which includes physical space, power and network cable. *We know that we will be supporting the active data equipment within the scope of this project. We do not know* whether the project will support active *video* equipment such as cameras, monitors, microphones or computers. We do know that the project will not support applications such as the software or the development of the software to run these services.

This outline is meant to clarify the services that are to be supported and is necessarily a draft that represents our understanding to date. Until we have an agreed upon definition of the services we will be unable to complete the design development phase of the project that we are currently in.

1. Video and Audio Services

A. Full Motion Video Conferencing

Context

Video Conferencing between one or more points that provides full motion video. *This service is provided as part of MetNet, which supports compressed video.*

Requirement

It is desirable to have a dedicated room in the Capitol – a room that supports a MetNet connection. However, this room is not practical at this time because the usage and associated costs do not support it. If the economics were to change, this would be re-considered. Additionally, due to the constraints on space identified during the space re-design, there is no space available for this room without giving up something that has already been designated as important. ***ISD feels a room of this nature in the Capitol would be used quite often.***

The idea of providing *compressed* video conferencing within a hearing room, to allow committee access to the public, schools and other Representatives was introduced on 12/8/97 by Representative Bob Keenan and referred to as the "Digital Democracy" *or "Electronic Republic"* concept. The requirement to support a digital democracy is unknown.

It was suggested that we designate one committee room from both the House and the Senate for access to MetNet to satisfy the requirement for additional digital/electronic access. We should not recommend class 1 committee rooms, for they are too difficult to flexibly schedule.

In terms of priorities, it was clearly stated that passive participation in hearings is more important than interactive participation. For example, having the ability to listen in to a hearing is more important than being able to electronically interact from a video monitor.

Infrastructure Support

Cameras, monitors, lighting and access to *MetNet* circuits would be required within hearing rooms to support the Digital Democracy.

Infrastructure outside of the Capitol would also be required, but is outside of the scope of this project. *There is currently only one connection available to MetNet within the Capitol. For simultaneous sessions, additional connections would be required.*

Action Items and Open Issues

1. *Identify a potential room from both the House and the Senate.*

2. *Describe the infrastructure requirements and estimated costs for this requirement.*

B. Desktop Video Conferencing

Context

A Local Area Network (LAN) application that is delivered to individual desktops that enables video conferencing between one or more points. These applications typically do not provide full motion video. The quality of the video is determined by the configuration of the LAN, the speed of LAN and the media used to support the LAN.

Requirement

The requirement for this application does not need to be articulated at this time, for it is accommodated by the planned infrastructure upgrade.

Infrastructure Support

The copper media that will be installed to the desktop and the fiber optic backbone installed will support at a minimum, 100Mbps, which should satisfy transmission requirements.

Action Items and Open Issues

None

C. Cable TV

Context

Access to cable television channels such as local, national and international channels. Access can be from a local cable TV provider or from a direct satellite feed service.

Requirement

Local, National and International news access is *desirable. This is especially true when important speeches are broadcast, the country is at war, or critical debates are broadcast from Congress.*

Infrastructure Support

Coaxial or fiber optic internal distribution of cable, both in the riser and out to the locations where television monitors would be placed. We are assuming that the riser will contain a cable "bus." Within each riser closet a splitter will be placed to split the signal from the bus into various station cable runs to specific monitors.

TCI has brought cable access into the Capitol building – this is likely to have been fiber optic cable. Details as to how this would be distributed

need to be determined. It is likely that they will require a small amount of space to regenerate and distribute their signal.

Action Items and Open Issues

1. *Meet with TCI to determine what further infrastructure requirements they have.*
2. *Recommend locations for television locations and present at the next working committee meeting. Locations suggested at the meetings are as follows:*

Both ends of the 1st floor
1st floor rotunda
lobby of the House
Cafeteria
Secretary of State's office
Governors office
House Leadership
Senate Leadership
Other Common Areas

D. Closed Circuit TV (CCTV)

Context

CCTV allows the re-broadcast of an event to locations hooked into the CCTV network. For example, a CCTV system would allow a hearing held in the Capitol to be re-broadcast to other rooms within the Capitol or other buildings that are supported from this network.

A CCTV system could also identify times, locations and status of events happening in the Capitol. Thus, instead of posting signs, video monitors could be used which would provide a real time ability to update the public on the status of hearings and other events.
The State of Oregon has a CCTV system installed at their Capitol campus, which has been in use for a long time.

Requirement

The most important part of a CCTV system is to create secondary spaces to accommodate overflow from hearings. However, we could not think of any space that would accommodate this and thus the idea was not pursued. In conclusion, this will not be a requirement at this time; however, we should develop a plan for a future implementation of it.

At the working group on December 8, 1997, the request was made to re-broadcast hearings to the schools around Montana and also to have some interactive abilities with the broadcast. *This requirement may be pursued*

in the future as an expansion of MetNet, but does not need to be further considered at this time.

Support Requirements

Coaxial or fiber optic internal distribution of cable in the riser and in the horizontal distribution systems with terminations in each location to be filmed or broadcast.

Acoustics, cameras, *wall finishes* and lighting to support filming of events.

Video headend that supplies the electronics for distribution of the signal. This headend would be located in a room that would be large enough for multiple monitors, storage, editing equipment and personnel to support the effort – similar to the control booth at a TV studio. This space would need to be larger than the existing media room on the basement level of the Capitol. *A space has been identified in the chiller plant building that could act as this video headend room.*

Distribution capabilities outside of the campus, i.e., to other State facilities, would need to be in place. These are not being considered as part of the Capitol Renovation Project.

Action Items and Open Issues

1. *Identify the video headend room in the chiller plant building, its' electrical, mechanical, space, and connectivity requirements.*
2. It was suggested in the past that ISD control the signal rights of all events within the Capitol. These could then be sold to other providers such as the television stations, which may in turn reduce their need for equipment in and near the Capitol. *This idea was not of interest at this time.*

E. Audio Distribution

Context

This system is similar to the CCTV system described above, but it only re-distributes the audio portion of the event. *A system like this* can support multiple channels thereby allowing the listener to tune in to the event of his or her choice.

There is a related system, which allows **state agencies** outside of the Capitol to use their phone sets to dial into the state phone system and listen to certain hearings. *During the last session, there were limits placed on how many lines could be available for this.*

Requirement

There is an existing system today in the Capitol and includes approximately 70 speakers *located at the Capitol and 6-7 speakers located in other buildings.* The House chambers and the Senate are wired today. This must remain in place. *There is also a connection to the sound system in room 325 however this is not accessible from the hard-wired speaker locations. Instead, dial up phone lines are used to access the hearings in this room as well as the House and Senate Chambers.*

There is a requirement to expand the system within the Capitol, both the number of speakers and the number of rooms that can be listened to. The specific requirement for expanding the system is unknown at this time other than understanding that every Legislators office needs to have a speaker. Would we provide this capability from other hearing rooms?

Infrastructure Support

The internal system is supported from copper wire that is attached to speaker boxes located within specific offices. Access from phone sets requires no additional infrastructure than what is needed to support basic phone service. Expansion of the lines available for this involves an expansion of the telephone switch and circuits supported within ISD *and an agreement from the Legislature to allow this type of access.*

Rooms that are being recorded require microphones.

Action Items and Open Issues

1. Identification of existing speaker locations.
2. Identification of what rooms will have recording capabilities – *we assume that all hearing rooms will have this capability.*
3. *Recommendation for expansion of service.*
4. *Investigate using a FM distribution system as the method of expanding this service.*

F. Kiosks

Context

These kiosks would be placed in public areas within the Capitol and provide things such as directions or information about what events are taking place.

Requirement

Kiosks are required. They will also serve to replace the public access terminals described in 1I below. At a minimum there will be one placed in the first floor rotunda space.

Infrastructure Support

Kiosk locations would require cable and power. *The Kiosks would be LAN based.* This server would need to be located in an environmentally controlled and secured room – such as the room that will be created in the basement for other shared equipment.

Action Items and Open Issues

1. *Recommend locations for kiosks. Supply a LAN connection and power for each.*

G. In-Room Projection of Network Accessed Information

Context

Presentation of materials during sessions that are generated from a computer.

Requirement

Supply screens and lighting in all of the hearing and assembly rooms. Target a few rooms to install built in video projection equipment.

Infrastructure Support

Built in Video Projection equipment. Lighting to facilitate audience ability to see projections. In-room cabling between specific locations such as lecterns, other presentation areas, and video equipment. Potential space requirements for projection equipment.

Action Items and Open Issues

1. *Develop minimum criteria for screens and lighting with associated infrastructure impact.*
2. *Develop sample description of full audiovisual capability within one hearing room with a recommendation as to how to proceed.*

H. Media Access

Context

Television stations wish to broadcast "live" from the Capitol.

Requirement

Yes. Currently MTN, a CBS affiliate and KFBB, a CNN, ABC and NBC affiliate have broadcast capabilities in the following 12 locations:

Room 405
House Floor
House Lobby

Room 312
Rotunda Dwn
Governor Reception

Senate Floor	Supreme Court
Senate Hallway	Rotunda Up
Room 108	South Entrance

There is a third feed from each of these locations that *is available for a third broadcaster.*

Infrastructure Support

The headend that supports the media access points described above is in the media room in the basement. This headend supports broadcast only. Roll around carts are used to bring cameras and audio feeds to the locations of the broadcast. Permanent cameras are not mounted for recording purposes. The signal is transmitted by microwave antenna that is mounted on the roof (access through room 427). There are two antennas in use today, one for each of the television stations. *There is room for more antennas on the roof if need be.*

Other media access is accomplished by dragging power and signal cables from vans parked outside of the Capitol to the location of the broadcaster. This is disruptive and presents a hazard to the public. *However, this only occurs very infrequently, perhaps a couple of times a year. Vans are usually parked against the west wing of the Capitol that support these special broadcasts.*

There is not a need for additional media access points – what is in place is sufficient. We may place empty conduits in strategic locations to assist with the cabling of these special occasions and should consult with the broadcasters about where they would be most effective.

Action Items and Open Issues

1. *Meet with the existing TV stations and possibly Sunbelt – KTVH for input into the locations of additional conduits.*

I. Public Access Terminals

Context

There are existing computer terminals that are located in four locations that provide the public with information about the status of bills during legislative sessions.

The current locations are:

Outside of room 317
Outside of room 437
East of House Chambers

Outside of the Supreme Court

Requirement

There will be no further need for these terminals, for their function will be replaced with Kiosks.

Infrastructure Support

These locations require power and Local Area Network access.

Action Items and Open Issues

None

J. *Sound Systems*

Context

Sound systems have been used to augment the audio portion of hearings and assemblies. These systems also facilitate high quality feeds into audio distribution systems and the ability to record a session.

There are sound systems installed in the Chambers and the old law library.

The effective use of sound systems requires new protocols of speaking within the sessions and a room that is acoustically treated. These things are so important as to be critical to the successful implementation of the system.

Requirement

There has been no stated requirement for additional sound systems. However, due to the problems with the one in the law library, additional acoustical treatment should be reviewed. Sound systems may be installed in the other hearing rooms in the future. Thus, we should look at the acoustics within each of these to determine whether or not they could be effectively treated during the restoration.

Infrastructure Support

Review the acoustical issues within the hearing rooms.

Action Items and Open Issues

1. *Review potential acoustical treatments of hearing and assembly rooms.*

K. *Security Cameras*

As an extension of the video issues, we discussed security cameras. However, we agreed that if the need for these were developed, these cameras would be considered part of a separate system associated only with the security system.

At this time, the security system requirements are not defined.

2. Wireless Services

The use of wireless Local Area Networks has gained momentum in historic buildings where the feasibility and cost of wiring desktops is difficult and prohibitively high. A wireless LAN offers a practical solution to these problems.

The question has been raised as to the feasibility of using a wireless solution within Montana's State Capitol instead of using wired solutions. In general, we have focussed on the use of wired solutions because of the superior bandwidth it offers, the standardization of the media and network interface cards and the reliability the systems. Wireless technology is racing to catch up to wired solutions, but is not quite there as a total solution. However, there are some specific applications where this is not true.

The largest application is in the use of cellular phones. Wireless, or cellular phones, have become an essential element of anyone who is required to conduct business away from their desk, and in fact were in widespread use during the last legislative session. Wireless modems have made access to the Internet and your "computer back home" available many places that you travel. And, we are beginning to see LAN's constructed with wireless technology, although usually for a specific purpose.

The suggestion was made to investigate wireless technology within the House and Senate Chambers. The House Chambers has built into it a raised floor that makes cabling possible. The Senate currently does not. The use of a wireless LAN at the Indiana State Capitol indicates that this is a working and viable solution to a difficult cabling problem, which may be appropriate here.

Discussion

As we reviewed the possibilities and applications for wireless technology, we agreed that a mixed use of wired and wireless LAN's would likely be the most practical application. A completely wireless LAN does not appear to meet the needs of the constituents of the building.

Relying on the use of cellular modems for Legislators is not an acceptable solution for a data session, unlike a telephone conversation, for it tends to last for approximately one hour. Because there is currently no in-state routing to an ISP, this could be very costly. It is likely that within the next couple of years, usage costs will go down because of negotiations with providers that are underway now.

The ideal candidate for a wireless solution is a transient person who has low bandwidth requirements. Wireless may also be a feasible solution for portions of assembly areas. For example, we could place a few wired outlets within hearing rooms and rely on wireless connectivity for expansion of service.

Action Items and Open Issues

1. Is there a comprehensive definition of all the services required/desired at the desktop within both the House and Senate Chambers? Can all of these be supported via wireless technology? For example, is there a wireless voting system? *Carl Hotvedt will contact the state of Indiana to investigate the solution that they are using. Legislative Services is currently in development of a Legislative Information System so this inquiry is timely.*
2. Conduct a spectrum analysis to determine where transmitters would have to be placed. Some systems require that transmitters are cabled together with a backbone cable and they usually require power. *At this time, we will not pursue this until a specific need is identified.*
3. At this time, wireless products are not standardized across the spectrum. Therefore, an investigation into potential products would increase the likelihood of providing an infrastructure that could support the selected system.
4. The examples of wireless technology that we reviewed are ethernet based. The networks within the Capitol are all token ring based. Further investigation into the developing products supporting token ring is needed unless the possibility exists of adding ethernet to the overall network architecture. *During our discussion, it was agreed that mixing ethernet and token ring technology is not an obstacle for the State.*
5. Define requirements for surge areas to determine potential use of wireless technology.
6. *As we determine areas that are difficult to wire, consider the use of wireless technology.*
7. *Plan for the use of wireless technology in hearing rooms to supplement the wired locations.*

This document represents our understanding of the items discussed and issues resolved. Please submit any further comments or corrections to Kathleen Clancy at KC/future planning, inc. in writing within 48 hours. Any additional information will be re-issued immediately.

CAPITOL RESTORATION PROJECT
MEETING MINUTES
AMENDED **MARCH 10, 1998**

MEETING: Information Services Division
MEETING DATE: February 10, 1998
LOCATION: Capitol Building, Room 410

ATTENDEES:

Paul Blumenthal	GSD
Bill Bayless	GSD
Carl Hotvedt	ISD
Ron Dobmeir	ISD
Steve Noland	ISD
Dennis Deppmeier	A&E Architects
Linda Kirkland	ISD
Michael Ageno	KC/future planning, inc.
Doug Olson	GSD
Ed Baum	ISD
Kathleen Clancy	KC/future planning, inc.

DISTRIBUTION:

Attendees	
Jim White	ISD
Tom O'Connell	A&E
Jim Bos	A&E Arch.
Greg Cunniff	Summit
Bill Lomica	Summit

NEXT MEETING: Date: **March 11, 1998**
3/10/98 amended items are noted in bold type.

ITEM	DISCUSSION		ACTION/COMMENTS
1.0	**Cabling Standards and Specification**		
1.1	Development of infrastructure standards by location type: A follow up meeting was to be held with Dennis Deppmeier and Mary Sue to develop a list of standard locations. From this, we will recommend a standard and report back to the working committees for review. It was noted that conference rooms do require voice jacks.		KC/fp to develop first draft of standard for next meeting.
1.2	Types of cable used:		KC/fp to investigate further in areas noted.
	Voice Backbone	Copper, **Category 3**	
	Data Backbone	Fiber Optic, multimode Some Cat 5 cable between floors	
	Voice/Data Station	2 cat 5 cables per outlet Voice and data cables Will be color coded, For example, red cable For data and blue cable For voice.	A 4.5"x4.5" backbox will be used to terminate the station cables in. Although we expect to use a single gang faceplate, this will provide room for future expansion.
	Video Backbone	**Coax, RG11**	

Video Station	**Coax, RG6 or RG11 as part of MATV system**
Audio Backbone/Station	**RG11 as part of MATV system**

1.3	Cable Terminations: Each cable will be terminated in an RJ45 jack at the station side and in a patch panel in the closet. All voice connections as well as data connections will be patched.	KC/fp toured the Mitchell building to view the emerging standard on cable terminations and the quality of installation.
1.4	Equipment Interface: There are no special patch panels required to support active network equipment connections. The equipment supports RJ45 jacks so that stations will be patched directly to the equipment. Voice ports will be terminated in patch panels as well for a straight patch from the station termination.	Information
2.0	Equipment Support Areas	
2.1	Riser Closets: Riser closets will be shared between electrical and telecommunicaitons. There will be no electrical transformers in the closets, only electrical panels. The rooms are large enough to support required distances between panels and the telecommunications equipment. The rooms are not designed to support servers.	Information
	24 hour air conditioning is required in these rooms. UPS support is not – it will be supplied by ISD – and card key access will be supplied by GSD.	KC/fp and ISD to recommend AC load criteria.
2.2	Basement Server Room: Room 17 has been identified as the dedicated server room. This room was intentioned to support all of the tenants in addition to being the main distribution frame for the voice and data systems. It will require access by resident system administrators, but is not designed to be a work area with a sit down desk. UPS is required in the room – just enough for a soft shut down. The UPS should be SNMP manageable. Card key access is required and is to be provided by GSD.	ISD and design team recommend the elimination of tenant server rooms. This needs to be discussed and agreed to by the stakeholders.

2.3	Tenant Equipment Rooms: As stated above, there will be a room in the basement large enough to support all tenant equipment, thus eliminating the need for rooms within the tenant space.	Stakeholders need to agree to using basement room.
3.0	Outside Plant Cable Servicing the Capitol	
3.1	Re-routing of campus cable from Mitchell Building: The copper cable comes into room 28 right now. We will extend this cable into room 17, for it was estimated that there was not enough slack in the cable to move it to room 17. There may not be enough copper cable to support the growing need in the Capitol.	Ed Baum to investigate the need for additional copper cable.
3.2	Re-routing of fiber optic campus cable: This cable would also have to be moved from room 28 to room 17. There appears to be enough slack in the cable to move the cable without having to add a new piece.	**Termination of fiber to be addressed to allow for testing**
3.3	US West Cable: We believe cable comes into the building from US West in two locations, room 16 and 58 and we believe each room supports a 50 pair cable.	Ed Baum to determine how much cable comes into the building and where. KC/fp to work with Ed and US West on maintaining their presence.
3.4	Requirement for MPOE: There is no requirement for a dedicated MPOE within the building other than a location to support US West described above.	Information
4.0	Video, Audio and Wireless Services	
4.1	There was no further discussion of these services.	
5.0	Technical Review of Dcoumentation by ISD	
5.1	During each of our visits to Helena, we will meet with ISD and review and update open items and the current status of the design. Their input and review of the work we are doing is essential to the success of the project.	KC/fp to track open issues and communicate directly with ISD to maintain a necessary dialog.

File - ISD meeting notes